---Index to Contents, July, 1938---

The Annual Index for each volume appears on the last eight pages of the December issue

Airports
Reading Constructs a Municipal Airport... 39

Buildings, Public
An Up-To-Date Auditorium... 77

Business Machines
Complete Machine Accounting for a Small Municipal Utility... 45
Depressing One Key Subtracts from Total... 99

City Beautification
Civic Home-Making in Memphis... 79

City Manager Appointments
Recent City Manager Appointments... 89

Conventions
When and Where... 97

Finance and Taxation
Is Your City Getting Its Share of the New Federal Funds?... 5
Vehicle Taxes for Local Roads... 13
Legal Provisions Regulating the Use of State Motor-Vehicle Funds for Local Roads and Streets... 60
Few Cities Need Invoke Municipal Bankruptcy Act... 87
Trend Toward Reducing 23,000 Assessment Districts... 89
29 States Now Exempt Housing Authority Property from Taxes... 89
Assessors Broadcast to Taxpayers... 89
The Municipal Bond Market... 89

Fire Prevention and Control
Large Fire Losses Can Occur in Small Towns 15
Ambulance Fights Fires... 15
Fire Protection in Pittsburgh... 15
Combine Water Tower and Ladder Truck 15
Progress in Fire Control... 51
Fireworks Control by Law... 87

Forward Steps
Items Contributed by Officials and Others 75

Government and Administration
The Municipal Administrator as a Planner 56
Sacramento City Employees Rate Own Worth... 87
Need for Standardization in Public Welfare Jobs... 89

Health
Mechanized War on Mosquitoes... 11
Wide Health Service of Sterilizing Lamps 11
Awards for Safety of Milk Pasteurization 11

Housing
A Campaign to Stimulate Building... 75
29 States Now Exempt Housing Authority from Taxes... 89

Legal Decisions
The City's Legal Rights and Duties... 91

Lighting, Outdoor
Lucite Reflectors Outline Night Highway 83
Come to Brighter Kingston... 109
You Can Have Well-Lighted Streets... 111
Chicago's Sodium-Lighted Intersections... 111

Motor Equipment
Motorcycles in Mosquito-Control Program, Charleston... 11
Fire Department Ambulance, Glendale, Calif... 15
Hydraulic Aerial Truck with Ladder... 99
Road Rollers Powered with Diesel Engines 101
Refuse Collection Trucks, New York City.. 101

News and Illustrations
Hints for Officials... 99

Parking Meters
Results of Norfolk's Parking Meters... 47

Parks and Recreation
In Honor of Joseph Lee... 38

Planning
The Municipal Administrator as a Planner 56
Municipal Land Reserves... 69
Scale Model of a Waterfront Development 75
A Street System Adjusted to Large Lots... 79
Zoning and Planning Notes... 85

Police
Policemen Find Fire Right in Their Car.. 7
Calling All New Cars... 15

Power Plants
Gas-Burning Diesel... 7
Average Annual Repairs $500 on Diesels 12, 15, and 17 Years Old... 63

Publications
New Books and Pamphlets... 93

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Public Utilities
Complete Machine Accounting for a Small Municipal Utility... 45

Public Works Administration
$965,000,000 Authorized for PWA Allotments 5
Procedure as to Applications... 5
Prompt Action Urgent... 5

Sewers and Sewage Treatment
Safety Precautions During Sewer Surveys 41
The Field for Sludge Dewaterers... 105

Street Cleaning
Jacksonville Broadcasts Talks by Street Cleaning Personnel... 65

Street Construction and Maintenance
Street Improvements, Connersville, Ind.... 13
City Rock Crusher Salvages Old Rock... 13
Vehicle Taxes for Local Roads... 13
Municipal Highways—Their Planning and Design—Part II... 49
Legal Provisions Regulating Use of State Motor-Vehicle Funds for Local Roads and Streets... 60
Bituminous Macadam for Municipal Pavements... 61
Road Rollers Powered with Diesel Engines 101
Improved Graders for City Work... 103

Traffic
Popular Parking Areas... 7
Merchants Pledge Themselves to Park Off Streets... 77
Providence Goes 111 Days Without a Fatality... 81
Solving Traffic Problems on the Facts... 81
197 City Traffic Surveys... 83
Reflectors Outline Night Highway... 83
Adjust Your Speed to the Signals... 83
Interstate Action Advised to Aid Motorists 87

Transportation
The Big Coach... 7

Unemployment Relief
The President Says to Mayor LaGuardia, Regarding Relief... 51

Waste Collection and Disposal
Incinerators for Garbage and Refuse Disposal... 54
Refuse Collection in 28 Cities in the United States... 57
Refuse Collection Trucks, New York City.. 101

Waterfronts
Scale Model of a Waterfront Development 75

Water Supply and Water Works
Delinquencies in Water Bills... 9
Leak Detection in Oak Park, Ill... 9
Diesel Engines, Water District, Buzzards Bay... 9
Water-Works Underground Survey, Lima, Ohio... 35
Water-Works in Venezuela... 52
Status of Municipal Ownership of Water Works in the United States... 53
Air-Conditioning and Water Supply... 67
Larger Foam-Making Water Nozzle... 99
A New Clamp Vise for Small Pipe... 101
New Cement Lining for Cast Iron Pipe... 103
Reconditioning of Pipe Lining Improved.. 105

Works Progress Administration
Water-Works Underground Survey in Lima, Ohio... 35

Zoos
Champion Polar Bear Diver, Quebec Zoo..Cover
Python Fed Through Special Rubber Hose 105

See pages 17, 18, 20, 93, 95 for catalogs and publications on municipal and civic subjects

For Index to Advertisements see page 114

IN

CORPUS - CHRISTI

TEXAS

Deep down in the Southland, where the tip of the mighty mid-continent dips its feet into the sea, is Corpus Christi, center of a prolific agricultural empire, headquarters for the lusty forces developing South Texas' tremendous oil and gas resources, port of call for the ships of the seven seas, favored vacation place for a nation's people. Located on the western shores of a crescent-shaped bay, for the most part high above the water, Corpus Christi possesses the materials from which great cities are made.

The water supply for Corpus Christi is taken from the Nueces River, an historically important stream, being impounded in an 8,000-acre lake, kept captive by a $2,000,000 dam. Before being placed in the city's mains it is scientifically treated under the most approved methods in a modern filtration plant. It is significant to note that the city's water plant has for years been regarded as a model by the State Board of Health. Pittsburgh Meters are used in their 100% metered system, just as in thousands of other modern distribution systems throughout the country.

CITY HALL

SUNSET SCENE

PITTSBURGH EQUITABLE METER COMPANY

MERCO NORDSTROM VALVE CO.

NEW YORK · BUFFALO · PHILADELPHIA · KANSAS CITY · TULSA · LOS ANGELES

Main Offices - PITTSBURGH, PA.

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PITTSBURGH WATER METERS

Is Your City Getting Its Share of the New Federal Funds?

Cities Challenged to Match Speed of PWA

THE Work Relief and Public Works Appropriation Act of 1938, which became a law last month, carries a total of $2,915,605,000 in new money, plus reappropriations and authorizations of about $835,000,000, for work relief, relief, and otherwise to increase employment by providing loans and grants for public works projects. In addition to the funds allocated to the Public Works Administration, to which this page of The American City is mainly devoted, the Act carres $1,425,000,000 direct appropriations for the Works Progress Administration. These WPA funds are earmarked so that not more than $484,500,500 shall be used for highways and streets, not more than $655,500,000 for public buildings, parks, public utilities, transmission lines, sewer systems, water systems, airports and other transportation facilities, flood control, drainage, irrigation, conservation, eradication of insect pests, etc., and not more than $285,000,000 for miscellaneous non-construction projects. The amount specified in any of the foregoing classes may be increased not more than 15 per cent by transfer of amounts from other classes. The United States Housing Authority section increases the bond-issuing powers of this agency from $500,000,000 to $800,000,000 for 60-year loans for low-cost housing, and authorizes contracts for contributions aggregating not more than $28,000,000 annually.

$965,000,000 *Authorized for PWA Allotments*

FOR "useful public works projects" of the kind and type heretofore carried forward by the Public Works Administration, a fund of $965,000,000 is authorized in the 1938 Appropriation Act approved last month.

Up to $750,000,000 of this amount may be used for grants for non-Federal projects. Grants will not exceed 45 per cent of the cost of a project. Up to $200,000,000 of the funds may be used for Federal projects to be selected from certain designated classes.

The fund set up will make it possible (by full utilization of the amounts) to authorize projects having total construction costs of $1,866,000,000. (Provision of $750,000,000 grants plus local contributions would enable $1,666,000,000 worth of construction. This, plus $200,000,000 of Federal projects, would equal $1,866,000,000.)

The Act authorizes the use of a $400,000,000 revolving fund realized from the sale of securities under this Act for financing loans for non-Federal projects.

Full financing must be provided for in plans for any project. The Act provides that no Federal funds are to be advanced to any public agency unless adequate provision has been made or is assured for financing the part of the project cost not supplied from Federal funds.

Localities wishing projects may file applications with seven PWA Regional Offices, located in New York, Chicago, Atlanta, Omaha, Fort Worth, San Francisco and Portland, Ore. Sub-regional offices are located at Harrisburg, Pa., and Columbus, Ohio. Applications will be examined in the Regional Offices, and recommendations will be made to Washington as to action. Final approval will be given in Washington.

New applications for non-Federal projects must be filed with PWA by midnight, September 30, 1938, to be eligible for consideration under the provisions of the bill. This dead-line does not apply to amendatory applications filed on applications which were submitted prior to October 1, 1938. Projects must be started prior to January 1, 1939, and substantially completed by June 30, 1940. This does not apply to any project enjoined in any state or Federal court.

PWA itself is continued to June 30, 1941.

Procedure as to Applications

APPLICATIONS for PWA allotments, whether for loan or grant or both, are requests originating with a public body. Applications are conceived, prepared and submitted by public bodies, and not by PWA. They are submitted by municipalities or other public bodies for the purpose of obtaining useful, permanent public improvements. Formal and authorized action by the applicant's city council, commission or board and legally selected officials is requested by PWA before an application is eligible for consideration. Such action eliminates any project a public body does not officially desire. Construction of the projects is undertaken entirely by the municipality, or other public body, PWA maintaining building inspectors on the job to see that the specifications and agreements and contracts under which PWA agreed to assist the project are complied with.

After an allotment has been made to a public body for a non-Federal project, an "offer" is sent by PWA to the applicant. The offer is a contract, through which the public body enters into an agreement with PWA that it will proceed with a particular project on the basis of receiving an outright grant of 45 per cent of the total cost of the project. (It may also include provision for a loan of the remaining 55 per cent.) The offers are signed legal contracts between the Government and the applicant confirming the approval and the conditions of the allotments.

When the offer has been signed by the applicant, it is then executed by PWA, and becomes a binding contract. Allotment funds are then advanced to the applicant in installments as the money is needed to advance construction.

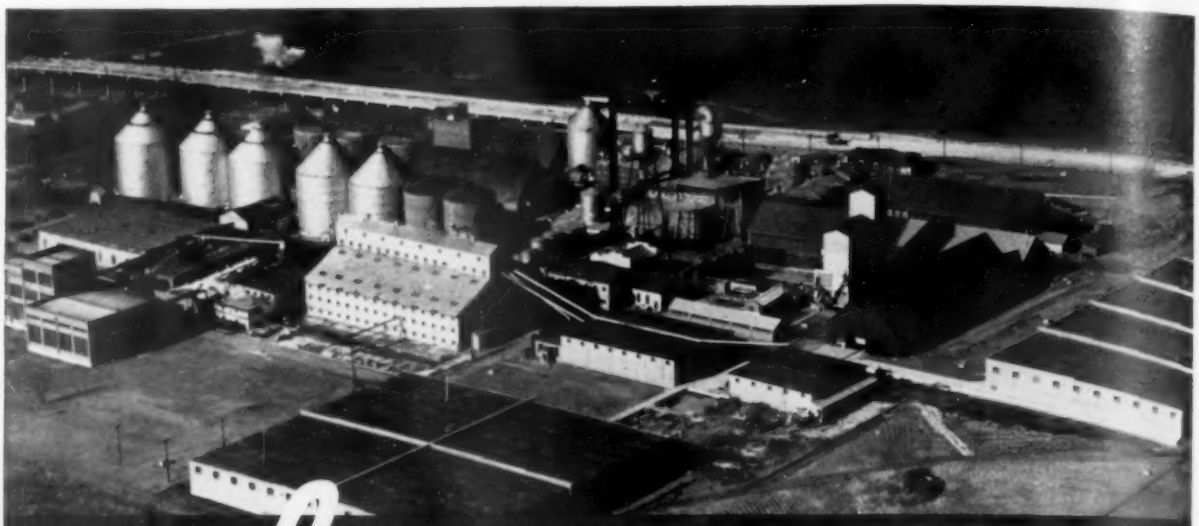
Prompt Action Urgent

APPLICATIONS previously pending, for which no funds were available under the previous PWA act, were approved to the number of 1,776 within three days after the signing of the 1938 Act, and within that same brief period 21 new applications received allotments. The total cost of these 1,797 projects will be $458,920,757, of which the Federal Government will supply $205,382,887 in grants and $24,282,500 in loans. Applications for approximately 1,300 other new non-Federal projects with total allotment value of $500,000,000 were received up to June 25. On that day Administrator Ickes announced:

"As a result of its experience, its organization and because of quickening of its procedure, PWA has been able to announce approval of entirely new projects within less than a week after the 1938 Act became law.

"We are following through on our drive for speed. If towns and cities can match our pace, we shall have a highly successful program. But if a municipality fails to keep up with our speed, it will be left behind and cannot participate in the program."

Under the previous PWA program allotments were made for 15,902 Federal projects and 10,543 non-Federal projects, or a total of 26,445 projects located in 3,068 counties of the United States and involving total costs of $4,338,367,974. Only 1,406 of these projects remain to be finished and, of these, 90 per cent are under construction.



Layne WELLS & PUMPS

FOR THIS BIG COTTON OIL COMPANY

MORE than 12,000,000 gallons of water are supplied daily from Layne Wells and Pumps now serving Proctor & Gamble's big Buckeye Cotton Oil Mills and their Linter Pulp Purification plant of Memphis, Tenn.—and their other cotton oil mills of Greenwood and Jackson, Miss.

For years these great mills have depended exclusively on Layne Water Producing Equipment. Proof of satisfactory performance is evidenced by the recent purchase of another big Layne Well and Pump, now under construction in Memphis.

Layne Wells and Pumps are world recognized for highest efficiency in water production. Just where they are superior in design and build is told in illustrated literature that may be obtained free and without obligation by addressing LAYNE & BOWLER, INC., Dept. B, Memphis, Tenn.

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LAYNE-TEXAS CO. . . . HOUSTON AND DALLAS . . . . . TEXAS.
LAYNE-WESTERN CO., KANSAS CITY, MO. CHICAGO, ILL., MINNEAPOLIS, MINN. AND OMAHA . . . . . NEBRASKA.
LAYNE-BOWLER NEW ENGLAND COMPANY. BOSTON . . . . . MASSACHUSETTS.
INTERNATIONAL WATER SUPPLY, LTD., LONDON . . . . . ONTARIO, CANADA

LAYNE

PUMPS & WELL WATER SYSTEMS

FOR MUNICIPALITIES • INDUSTRIES • RAILROADS • MINES AND IRRIGATION

Our Municipal Notebook

The Big Coach

THE largest-capacity trackless vehicle yet produced has just been built and successfully demonstrated in Akron, Baltimore and Washington, by Frank R. and William B. Fageol, President and Vice-President, respectively, of the Twin Coach Co. It is known as the Super-Twin. Significant of the future of this vehicle is the fact that it was these two men who in 1927 introduced the first transit or metropolitan or box-type bus, now the standard type.

This commodious new coach—operating either as a trolley coach or a diesel-electric vehicle—seats 58 passengers and can carry 120 or the average loads of 70 passenger automobiles (six persons to four cars). Has city transportation use for such a vehicle?

The answer is forthcoming from the presidents of two of the most important street-railway systems in this country. THE AMERICAN CITY asked them this question:

What are the characteristics of a new vehicle which engage your chief interest?

Executive No. 1: The new vehicle which engages our principal interest is the modern, large-capacity, quietly operating street car, and two types of gasoline buses, one of as large type and seating as many passengers as possible, and the other a small unit of durable construction for operation in thinly populated territories.

Executive No. 2: Must be able to hold its place in a traffic line. Accomplished by very rapid acceleration. Good riding qualities.

Super-Twin meets the requirement of large capacity. The rapid acceleration provided by General Electric motor and control equipment is matched by as rapid deceleration by Westinghouse air brakes. Easy handling is further attained by articulation which permits the vehicle to turn on a radius no larger than that of a 35-passenger bus. Said *The Sun*, Baltimore, of June 10, it "gets around corners easier, for example, than the considerably shorter buses on the Charles Street line."

An important group of transit officials hold that the unit labor cost on a 40-passenger vehicle is too high for handling peak crowds most economically. Super-Twin offers its services for this heavy-traffic hauling.

THIS COACH DOES THE CARRYING JOB OF 70 PASSENGER AUTOMOBILES

"Created as a rubber-tired public carrier capable of equaling the capacity of the largest city street cars, and at the same time able to turn within the ability of a 35-passenger bus," says Ross Schram, Sales Manager of Twin Coach Co. This demonstrating vehicle is diesel-electric, with a 175-hp Hercules diesel engine

Popular Parking Areas

THE solution to the parking problem in congested districts is either to provide adequate and popular off-street parking space or to establish orderly on-street parking through the use of parking meters, or a combination of both plans.

What has been achieved by the model village of Garden City, N. Y., in the provision of adequate, convenient and popular municipal parking fields is both an inspiration and a point of chagrin. Communities that are still gifted with spacious back-yard areas behind their business establishments would do well to step quickly in the direction shown by Garden City. Where these rear domains have already become a jungle of buildings, outhouses, pole lines, and alleys, the idea of municipal parking lots, custom-planned to fit the needs of individual blocks and even stores and apartments, will have to be filed along with other items of "might have been,"—and the proved advantages of parking meters made the most of.

...d Carolyn, seven, found ...

Policemen Finally Find Fire, Right in Their Car

Race 3 Miles to Manhasset Fire Station for Help

Special to the Herald Tribune

MANHASSET, L. I., June 9.—Patrolman Edward Wahl, of the Nassau County police, ...

IF ALL police cars carried fire extinguishers, the story above, in the *New York Herald Tribune* of June 10, might never have been written. However, it is getting to be a matter of course thus to equip police vehicles, even motorcycles. For instance, of 90 cities in the 25,000 to 100,000 population class, 53 send motorcycle officers to alarms of fire. As motorcycles in 33 of these cities are radio-equipped, they receive an alarm quickly. Sometimes one or more are already in the vicinity of the fire and reach it ahead of the fire department, and put the fire extinguisher to valuable use. Then, there is the matter of safeguarding the vehicle itself. As William H. Easton, Technical Director of the Safety Research Institute, points out, there are many ways in which car fires can occur: "Electrical short circuits and defective wiring; backfire; overheating around motor and exhaust; leaks in tanks, pipes and carburetor; overheated brakes; cigarette stubs and pipe ashes." Extinguishers are cheap.

Gas-Burning Diesel

THE nine-months operating record of a gas-burning diesel engine at the Lubbock, Texas, municipal plant was presented in the August, 1937, issue of this magazine. The success of this engine, which burns gas on the true diesel cycle, is established by the fact that the Nordberg Manufacturing Co. is building a similar unit of 2,250 hp for Lubbock. With natural gas available for 14 cents per 1,000 cubic feet, a kwh can be produced at a fuel cost of $0.00172, against $0.0032 by fuel oil at 3.1 cents per gallon. This manufacturer was also the first American company to build large two-cycle diesels and during the last two years for municipal service alone has installed 1,000-hp units at Cedarburg, Wis., and Garnett, Kans.; 1,100-hp at Rochelle, Ill.; 1,250-hp at Marshall, Mich., and Tarboro, N. C.; 1,500-hp at Sioux Falls, S. Dak.; 1,650- and 2,250-hp at Lubbock; 2,000-hp at Greenville, Texas; 2,250-hp at Carthage, Mo., Grand Haven, Mich., and Ponca City, Okla. Here are 19,750 hp in 12 units in 11 municipal plants.

ELEVATED STORAGE

simplifies water supply problems at BLUE ISLAND

THE answer to the problem of providing a city with an adequate supply of water at uniform pressures through the use of modern elevated storage is strikingly illustrated by the recent experience at Blue Island, Ill.

This fast-growing municipality is located directly southwest of Chicago, and has a population of approximately 16,500. The minimum daily water consumption is 1,800,000 g.p.d., and at peak periods during the summer months the maximum of 3,000,000 g.p.d. is reached. Blue Island's water supply is obtained from Lake Michigan, via the Chicago waterworks system — through two 8-in. connections. In past years, in the event of a break in either of these two mains, the supply of water would have been materially reduced, and if breaks occurred in both simultaneously, the residents of Blue Island would soon be without water.

Since the recent installation of the 1,000,000-gal. Horton elevated storage tank shown above, however, all danger of such an occurrence has been eliminated. The tank, which is filled during off-peak periods, maintains a uniform pressure throughout Blue Island, even during peak load periods. This has not only materially increased the efficiency of the entire water supply system, but has provided a reserve for fire flow which was not available previously.

It is another example of how large-capacity elevated storage is helping to solve water supply problems in cities all over the country. Address our nearest office for complete information.

CHICAGO BRIDGE & IRON COMPANY

Chicago	2127 Old Colony Bldg.	Philadelphia	1616 "1700" Walnut St. Bldg.	San Francisco	1033 Rialto Bldg.
New York	3308-165 Broadway Bldg.	Boston	1501 Consolidated Gas Bldg.	Houston	2919 Main Street
Cleveland	2236 Rockefeller Bldg.	Birmingham	1502 N. Fiftieth Street	Tulsa	1625 Hunt Bldg.
Detroit	1501 Lafayette Bldg.	Dallas	1406 Liberty Bank Bldg.	Los Angeles	1403 Wm. Fox Bldg.

Fabricating plants in CHICAGO, BIRMINGHAM, and GREENVILLE, PA.

Delinquencies and Leaks in Water Works

Delinquencies in Water Bills

THE Citizens League of Cleveland, Ohio, has been making an intensive study of delinquencies in water rents, because $1,630,000 in delinquencies has accumulated in six years. The League makes a plea that the shut-off required by law should be enforced and a tax lien law enacted. Unfortunately, in times of depression, it is difficult for any city water department to deprive a family of this all-essential commodity. It seems, however, that the worst offender in increasing water-rate delinquencies is not a soft-hearted water department, but rather the political expediency of city officials in other departments.

As part of its study, The Citizens League has tabulated the accumulated water rents as of July 1, 1937, for a number of cities in the United States. These are reproduced below:

ACCUMULATED DELINQUENT WATER RENTS

City	Total Average Annual Sales	Accumulated Delinquencies
Detroit	$6,000,000	$ 386,144
Cleveland	5,500,000	1,657,582
St. Louis	3,800,000	293,144
Milwaukee	2,300,000	5,407
Washington	1,500,000	3,902
Buffalo	2,200,000	64,303
Cincinnati	2,600,000	None
Denver	2,500,000	4,003
Minneapolis	1,400,000	50,000
Columbus	1,250,000	36,000

The comment made in *Greater Cleveland*, the weekly publication of The Citizens League of Cleveland, is as follows:

"It will be seen that Cleveland's accumulated delinquency is about 33 per cent of the annual sales, while in Detroit it is only 2/10 of 1 per cent; and in Cincinnati it is zero. The figures for all of the cities of the country are not available, but from what we have been able to ascertain, no other large city in the country, except Boston, begins to compare with Cleveland's high percentage of delinquencies."

Leak Detection in Oak Park, Ill.

IN JULY, 1937, a crew of two men was organized and instructed in methods of leak detection in Oak Park, Ill. The work also included the inspection and location of all service shut-offs for re-check against the present records and for the use of the repair department in the maintenance of buffalo boxes and for the immediate repair of leaks.

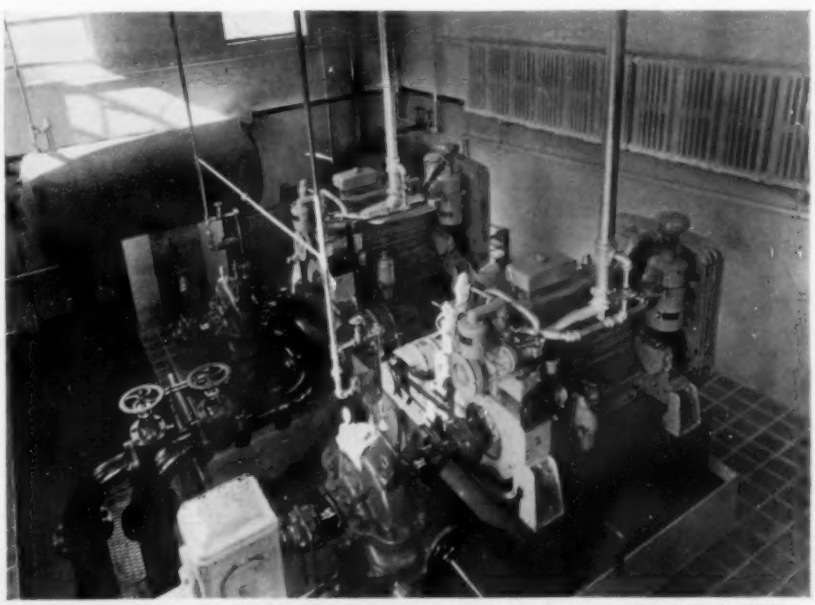
In July two leaks were found in a 20-inch water main totaling 12,000 gallons per day, a valve leak amounting to 2,000 gallons, and seven service leaks totaling 68,000 gallons per day. The August record shows a 5,000-gallon leak in a 6-inch water main, and seven service leaks totaling 38,000 gallons. The September record shows the location and repair of five service leaks which were accounting for 312,000 gallons per day. A total of 58,000 gallons of water per day were accounted for by six service leaks located and reported in October, and in November a valve leak of 1,000 gallons a day was stopped and seven service leaks amounting to 20,000 gallons per day were located and repaired. The December record, although accounting for only two service leaks, put an end to the waste of 136,800 gallons per day.

The distribution system of Oak Park, Ill., contains 136,485 feet of 4-inch pipe on which are 250 valves and 287 hydrants; 238,109 feet of 6-inch pipe on which are 410 valves and 861 hydrants; 112,657 feet of 8-inch pipe on which are 176 valves; 40,615 feet of 10-inch pipe having 63 valves; 26,954 feet of 12-inch pipe having 53 valves; 11,032 feet of 16-inch pipe with 29 valves; and 1,448 feet of 20-inch pipe with two valves. There is a total of 107.44 miles of water main in the city. The 1,148 hydrants in the city include 859 Eddy hydrants, 287 Mathew hydrants, 1 Watrous and 1 Kennedy hydrant.

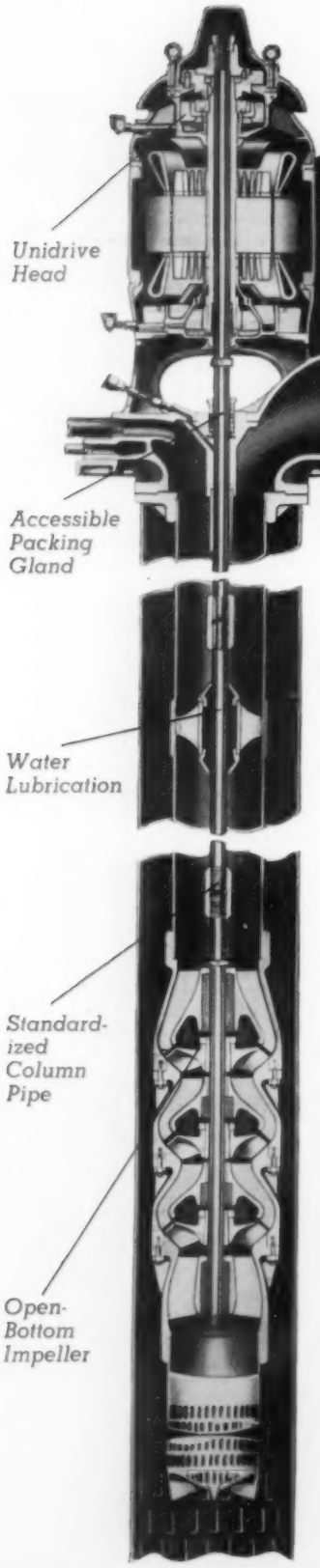
MARSHALL S. DUTTON,
Superintendent, Water Department,
Oak Park, Ill.

DISTRIBUTION OF WATER CONSUMPTION
OAK PARK, ILL., POPULATION 70,000—1937
ACTUAL CONSUMPTION FROM METER RECORDS

	GALLONS			
	One Year	One Day	% Total	Per Capita Per Diem
River Forest	6,830,000	18,712	0.30	0.27
Industrial (monthly)	50,702,250	138,910	2.36	1.98
Quarterly accounts	1,075,879,410	2,947,614	50.22	42.11
Monthly accounts	679,373,750	1,861,298	31.68	26.59
Sub-total	1,812,785,410	4,966,534	84.56	70.95
Playground pools	7,380,000	20,219	.34	.03
Park district hose connections	94,200	258	.00	.00
Park pools	560,000	1,534	.02	.02
Flooding parks—skating	768,000	2,104	.04	.03
Flooding vacant lots—skating	540,000	1,479	.02	.02
Flooding playgrounds—skating	496,000	1,359	.02	.01
Testing meters in shop	31,000	85	.00	.00
Testing fire hydrants	404,280	1,108	.02	.02
Cleaning reservoir	638,000	1,748	.03	.03
Public uses and losses	319,377,718	875,007	14.95	12.50
Total	2,143,074,608	5,871,435	100.00	83.61
River Forest consumption	6,830,000	18,712	.30	.27
Total for Oak Park	2,136,244,608	5,852,723	99.70	83.34



THE BUZZARDS BAY WATER DISTRICT ON CAPE COD, MASS., USES THESE TWO CATERPILLAR D4400 DIESEL ENGINES, EACH DRIVING A WORTHINGTON 2-STAGE CENTRIFUGAL PUMP AND A 3-KW ELECTRIC GENERATOR



Only Pomona GIVES THESE PLUS Values!

POMONA Oceans of Water PUMPS

1. ***Unidrive Head:*** Designed specifically to apply power for pumps. Only POMONA provides a non-reverse ratchet which positively prevents damage from shaft rotating backwards.

2. ***Accessible Packing Gland:*** Accessible packing gland above ground, avoids expensive repairs which are inevitable if this part is hidden at the bottom of the drive shaft.

3. ***Water Lubrication:*** Positive lubrication by water being pumped. Stainless bearing surfaces. Only POMONA provides full-floating rubber bearings.

4. ***Standardized Column Pipe:*** Column pipe, like all other parts is interchangeable and fully standardized. Lines up accurately. Simplest and most economical to install.

5. ***Open-Bottom Impeller:*** Open-bottom bronze impellers are adjustable for water capacity and wear. Operate in stream-lined, pocketless bowls, insuring long life and lowest power consumption. A properly lubricated bearing in every bowl.

More than 36 years of determined effort of POMONA engineers have developed refinements found only in POMONA pumps. These refinements of design, combined with the best of materials and precision workmanship in the world's largest turbine pump factory make POMONA pumps the most economical and dependable.

10 years ago POMONA was 10 years ahead, and today is another 10 years ahead.

POMONA distributors are located in all principal cities to render complete service before and after installation.

POMONA PUMP CO.

Manufacturing Plants: Pomona, California, and St. Louis, Missouri
Branch Offices: New York, Chicago, Los Angeles, San Francisco

POMONA *Water-Lubricated* TURBINE PUMPS

Health Activities for Municipalities

Mechanized War on Mosquitoes

THREE-WHEEL motorcycles, painted blue and trimmed with white and carrying a 35-gallon compressed air tank over the two rear wheels and back of that two 10-gallon oil tanks, have been adopted by the Charleston County Health Department, Charleston, S. C., in its war on mosquitoes. These two Harley-Davidson Servi-Cars were received early in April and were completely outfitted by students of the Murray Vocational High School of Charleston.

After every rain nearly an inch of water accumulates in the various catch-basins about Charleston, and these basins must be sprayed to prevent the breeding of mosquitoes in the stagnant water. Two men have been assigned to the motorcycle detail by the County Health Department, and both are members of the mosquito inspection squad. They are now working full time with these vehicles, making a complete circuit of the city about every ten days. It requires approximately ten days for malarial mosquitoes to complete the cycle from eggs to insects, so that the spraying of the breeding places every ten days prevents breeding.

The oil used is of the type used in diesel motors, and when sprayed on the surface of the water in catch-basins it makes a thin film over the surface, sufficient to clog the breathing tubes of the mosquitoes.

Dr. Leon Banov is County Health Officer in charge of mosquito control.

Wide Health Service of Sterilizing Lamps

MORE than five years ago Drs. Rentschler and James of the Westinghouse Lamp Research Laboratories began work on their process of sterilization by means of Sterilamps. These lamps are now in use in many experimental installations in hospitals, drug stores, soda fountains, restaurants, dairies, manufacturing plants and elsewhere. That this method of sterilizing is applicable to the atmosphere itself has been demonstrated by several manufacturers of products who have installed Sterilamps in the air ducts of their ventilating and conditioning systems. Tests indicate that an exposure of 1.2 seconds kills 90 per cent of the bacteria in the air. Air in a particular location was kept sterile by installing lamps over that spot and flooding it with constant radiation.

A recently published survey of a test conducted on glasses in several New York soda fountains picked at random showed that water rims produced 37, 112, 225 and 330 colonies of bacteria, while milk glasses produced 114 colonies, and fruit-juice glasses 115 and 444. Two professors of Michigan State College, investigating public places in Lansing, found as many as 100,000 bacteria on a single glass, while bacteriologists at Massachusetts State College went them 250,000 germs per glass better. An examination of soda fountain glasses in Montgomery, Ala., revealed that 40 per cent of the bacteria found were pathogenic; that is, capable of producing disease.

Sterilamps have been used in series along the inside baffles of bars and soda fountains, in wire glass-holders and in other convenient forms, operating at temperatures only 4 or 5 degrees above room temperature, giving 99.9 per cent sterilization in a few seconds and maintaining constant sterility to the time of using.

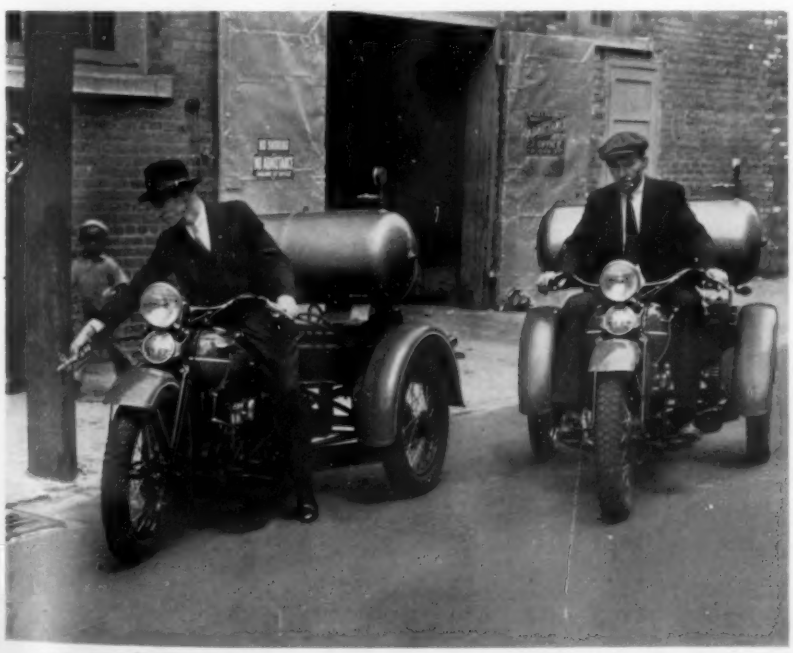
The use of this method of sterilization in the care and handling of meat has shown another field of applying this effective ultra-violet lamp.

Awards for Safety of Milk Pasteurization

THE ultimate safety of pasteurized milk depends upon thoroughness of processing and complete protection from recontamination after it is pasteurized. Modern pasteurizing equipment is designed to fully protect the final product, but the personal element is still an important factor in operating the equipment and handling the containers. Proper operation and handling requires a thorough understanding of the principles of sanitation involved. Training, experience and appreciation of the responsibility on the part of milk-pasteurization plant personnel is a deciding factor in the safety of the finished product.

The responsibility of operating pasteurization equipment is so important in protecting the health of milk consumers that persons engaged in this work should be well qualified to carry on the work. In order to give proper recognition to persons qualified to undertake the responsibility, the Illinois Department of Public Health proposes to issue Certificates of Competency to such operators of pasteurization equipment. Issuance of the certificates will be based on training, experience and evidence of interest in handling an important and perishable food product as may be revealed by examination. No fee will be charged.

As a means of improving methods of operation and promoting improved milk-plant construction and equipment, the Milk Sanitation Section of the Division of Sanitary Engineering of the Illinois Department of Public Health has held one-day conferences for milk-plant operators. The first of these was held in March, 1937. "The results have proven so satisfactory," reports S. V. Layson, Milk Sanitarian of the Department, "that a series of evening conferences, to be held at central locations over the state, are now being planned." The conferences in a community will be held one evening a week over a period of four or five weeks.



THE MOTORCYCLE DETAIL IN THE CHARLESTON COUNTY MOSQUITO-CONTROL PROGRAM, CHARLESTON, S. C.

October 25-28, 1938
American Public Health Association
Kansas City, Missouri

"PERMANENT CARRYING CAPACITY"

MONO-CAST

ENAMELINE

CAST IRON PIPE & FITTINGS

PIPE MANUFACTURED BY THE
MONO-CAST CENTRIFUGAL METHOD
IN SAND-LINED REFRACTORY
MOLDS

"LOWEST PUMPING COST! PERMANENT HIGH "C" VALUES"

"ENAMELINE" is the trade name for a three-coat lining applied to the interior surface of Mono-Cast pipe and fittings. The first two coats consist of a special mortar made up of Portland Cement mixed with clean silica sand, and the third coat is an asphalt paint. It is offered as an alternate for standard tar coating—at no extra cost—and is recommended for water main service throughout the United States except in very special cases where additional thickness of lining would seem to be desirable.

AMERICAN CAST IRON PIPE COMPANY

New York City Chicago **BIRMINGHAM, ALABAMA** Los Angeles San Francisco
Pittsburgh Kansas City Minneapolis Dallas Cleveland

Street Improvements

OHIO AVENUE, CONNERSVILLE, IND., SEMI-HARD-SURFACED WITH LINCOLNITE

Street Improvements in Connersville, Ind.

BY hard-surfacing and semi-hard-surfacing practically all the streets of Connersville with Lincolnite and Kentucky rock asphalt a tremendous improvement has been made in the character of the streets of this city. The labor was done by the Street Department of Connersville in cooperation with the WPA and at a figure lower than those submitted by contractors. As a result of this program, the streets are dustless and are now more economical to maintain for heavy motor traffic. Some of the streets are now open for traffic for the first time in 35 years.

By using pit-run gravel which costs the city practically nothing, great economy has been effected, particularly since the Lincolnite powdered asphalt can be used with this gravel and does not require expensive aggregate. The semi-hard-surfacing with Lincolnite was done at a material cost of 12 cents per square yard of surfacing one inch thick.

WILLIAM F. DENTLINGER,
Mayor, Connersville, Ind.

City Rock Crusher Salvages Old Rock

THE city of Memphis, Tenn., operates a plant to crush rock, concrete and asphalt, and before the end of 1938 will have salvaged more than $84,000 worth of old pavement materials for use in resurfacing and repairing streets. A Cedar Rapids crushing and screening plant has been installed at the city asphalt plant and is operated by the same steam power that runs the latter plant. The rock crusher and screens are mounted on a specially built concrete base with ramps and storage bins. Trucks delivering material drive up the ramp and unload into the crusher. After being crushed, the material slides through chutes into storage bins.

Before the Department of Public Works purchased this plant, it was able to utilize only a limited quantity of old concrete for lining bayous and drainage ditches. Much of the material removed from the streets had to be discarded. This material can now be crushed into sizes ranging from ¼-inch to 2 inches.

The cost of the crushing plant, installed and ready for operation, was $7,000. Since power is furnished by the asphalt plant, the cost of salvaging material will average only 15 cents a ton. The capacity ranges from 150 to 200 tons a day. The plant has been approved by the Works Progress Administration and is used to crush and supply material for the city's WPA street projects.

About 60,000 tons of old asphalt and concrete, to which will be added about 24,000 tons in the course of this year, are stored at the asphalt plant and other city properties. The economy of conserving such a quantity of valuable material is obvious.

O. P. WILLIAMS,
Commissioner of Public Works,
Memphis, Tenn.

Vehicle Taxes for Local Roads

THAT highway users should be charged in accordance with their utilization of highway facilities is the generally accepted theory upon which the gasoline tax and registration fee are established. It appears to follow, therefore, that the distribution of such taxes to various parts of the highway system should reflect the relative traffic volumes which they carry.

In the period of rapid highway expansion which paralleled the growth of motor-vehicle travel, the theory that those who used the roads should pay for them was generally conceded, but financial pressure created by the need of a new system of main roads made it neither possible nor desirable to adopt the corollary that funds should be spent with exact regard to their origin. With the progress of a primary system of highways which such concentrated finance made possible, however, there originated in both counties and municipalities a demand that some part of state tax collection be returned for local roads and streets. Today the wide range and relative proportions of funds made available to local governments suggests no more scientific consideration than the loudness of these demands. In 1936, three states returned more than half of total highway user imposts to local units of government, eleven over one-third of such collections, and five states made no allotments whatever. Local roads in one state received 24 million dollars in state taxes, while in each of ten other states less than a million dollars was distributed for highways in local jurisdiction.

—From a statement presented by THOMAS H. MCDONALD, Chief, U. S. Bureau of Public Roads, as Chairman of the Committee on Highway Finance, Highway Research Board, National Research Council.

THE WORKMANLIKE MOUNTING OF THE NEW ROCK-CRUSHING AND SCREENING PLANT AT MEMPHIS, TENN.

ELEMENTS of PUBLIC SAFETY

GAMEWELL

Fire Alarms

ADVERTISE PUBLIC SAFETY

Many officials and citizens apparently still believe that b e c a u s e community Fire Losses are low — or lower than they have been — no necessity exists for improvements in fire protection. In this unsound and dangerous opinion, there exists the reason for many future conflagrations. The Fire Record affords ample evidence of the danger of unpreparedness —and of staking human life and property on the gamble that "It Can't Happen Here!"

It is good business to invite new industries to locate in the home town but better business to first protect those already established. It is bad advertising for a community to lose an industry by Fire.

Prompt alarms eliminate serious fire loss. Render Gamewell fire alarm boxes— accessible and visible—at all points of Fire Hazard. *Let taxpayers see what they are getting for their money.*

Police Signals

Write for descriptive literature.

THE GAMEWELL COMPANY

NEWTON UPPER FALLS MASSACHUSETTS

Public Safety

Large Fire Losses Can Occur in Small Towns

at all.

Village Has $125,000 Fire

Addison, Me., Business District Virtually Wiped Out

ADDISON, Me., May 8 (AP).—The business district of this little eastern Maine town was virtually wiped out by a $125,000 fire today. Fire Chief Daniel Dobbins, of near-by Jonesport, who estimated the loss, said the flames razed seven wooden buildings and damaged two others greatly, another slightly. The cause was not determined.

Three sleeping children were rescued from an apartment above a grain store.

Ambulance Fights Fires

CHIEF ENGINEER A. H. LANKFORD of the Glendale, Calif., Fire Department needed three trucks: one for the mechanical bureau; one for fighting small fires such as automobile, grass and brush; also an ambulance. Money for all three was not available, so the capabilities were combined in one vehicle. Says Master Mechanic W. M. Richard: "We selected a truck that is rugged in construction, for the mechanical department; has plenty of power, as a fire pump; and, while pleasing to look at, has plenty of speed as an ambulance. This International Model D-2 is equipped with a 100-gpm high-pressure pump, a 40-gallon water tank, 18 feet of 2-inch suction hose, and 150 feet of 1-inch hose. Pump, power take-off, and water tank are suspended underneath the floor boards and attached to the frame channels. The entire body could be used to carry equipment; but portable fittings have been constructed for this truck so that the truck can quickly be converted into a two-patient ambulance."

Calling All New Cars

ONE day recently, Mayor F. H. La Guardia of New York told Police Commissioner Lewis J. Valentine that, having inspected the 308 new pieces of police motor equipment costing $200,000, he would like to see them in action. "I will leave you," he said, "and send you a radio message. As soon as you receive it, put your equipment in motion and come to the point where I direct. There I will review the equipment."

The Mayor then entered an old automobile and drove to the Public Library, where at 10:44 A.M. this radio call was put in and dispatched from Headquarters:

"Cars at the Battery, lower Manhattan: Report forthwith to Fifth Avenue and 41st Street. Do not proceed on West Side Highway."

At 10:59 the first motorcycle outrider passed the Mayor, and the brand-new motorcade, headed by Deputy Inspector Hugo O. Wunsche in charge of the Motorcycle Division, riding in the first sidecar radio motorcycle, passed by in 11 minutes in the following order:

69 Indian motorcycles
180 Plymouth patrol cars with cream-colored tops
30 small Plymouth squad cars
10 larger Chrysler squad cars
5 Chrysler sedans
9 Reo patrol wagons
5 trucks (2 Dodge supply trucks, 1 G.M.C. supply and 1 G.M.C. tow truck, 1 White tow truck for traffic-light maintenance)

Fire Protection in Pittsburgh

THE present city administration is in accord with me on a planned annual budget for replacements, and in buying several pieces each year the department profits by the improvements which the apparatus manufacturers are continually making.

Our principal pieces consist of 48 pumpers and combinations, 10 aerial ladders, 12 service ladders, 1 special duty truck, with an additional one of each of these types on reserve. Of our pumping engines, 24 are over 15 years old; and so are 14 ladders.

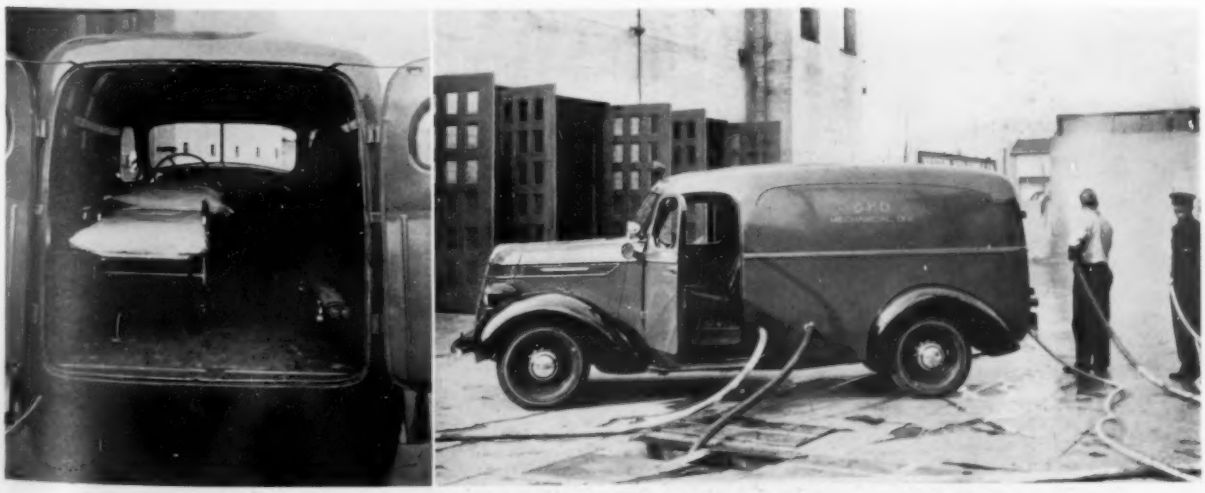
At every opportunity, I stress the importance of sending alarms from fire-alarm boxes, and point out actual instances of error and the many opportunities for making mistakes unless the boxes are used.

NICHOLAS A. PHELAN,
Chief, Bureau of Fire, Pittsburgh, Pa.

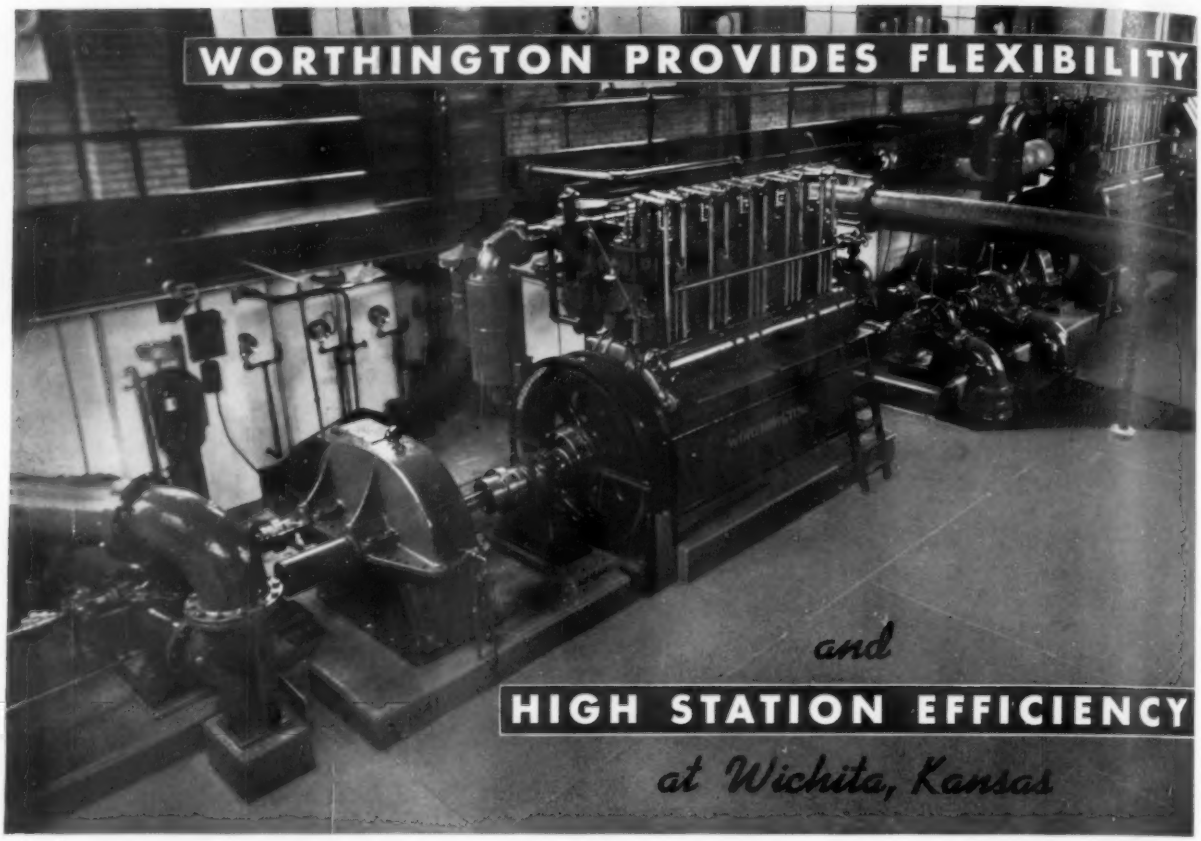
Combine Water Tower and Ladder Truck

Insistence by the National Board of Fire Underwriters that in the high-value district of Los Angeles a water-tower must respond on first alarm, and the fact that the tower was actually needed only three times in two years, led Chief Ralph J. Scott to the combination of water-tower with ladder truck shown at right. A four-door sedan cab carries seven men

AMERICAN LaFRANCE TOWER AND LADDER



GLENDALE, CALIF., FIRE DEPARTMENT AMBULANCE, EQUIPPED WITH 1000-GPM PUMP



The Pumping Station of the Wichita Water Company at Wichita, Kansas, is a tribute to the ability of Worthington to keep pace with the demands for flexibility *with high efficiency, under all conditions* in a modern pumping plant.

In 1927, a Worthington steam-turbine-driven pumping unit (4.36-MGD) was installed. The turbine also drives a 200-kw. generator furnishing power for auxiliary equipment, including a Worthington 1.5-MGD motor-driven booster pump.

In 1937, two large Worthington gas-engine-driven units were added. The first, shown above at the left, is a 4-MGD (310-feet head) unit with a Worthington two-stage pump, driven by a 300-hp. gas engine.

The second unit, rated at 8-MGD, consists of a 5-MGD Worthington pump and a 3-MGD Worthington pump, connected by a friction clutch, driven by a Worthington 450-hp. gas engine which also drives a 75-kw. generator, belted from the engine extension shaft. The combined capacity is 8-MGD against 185 feet head, when operated in parallel.

These units, working in conjunction with the other units, enable the station, which is 90% Worthington, to secure a very wide range in capacity, with high station efficiency throughout.

The gas engines are convertible to oil fuel operation within a short time at little cost.

This measure of Worthington efficiency and flexibility..with Diesel, gas or steam power..is available for stations of all sizes.

DIESEL ENGINES
GAS ENGINES
STEAM TURBINES
REDUCING AND INCREASING GEARS
CENTRIFUGAL PUMPS
STEAM AND POWER PUMPS
DEEP WELL TURBINE PUMPS
SUMP AND DRAINAGE PUMPS
STEAM CONDENSERS
CONDENSER AUXILIARIES
STATIONARY FEEDWATER HEATERS
STEAM-JET EJECTORS
STATIONARY AIR COMPRESSORS
PORTABLE AIR COMPRESSORS
ROCK DRILLING EQUIPMENT
CONSTRUCTION AIR TOOLS
V-BELT DRIVES
AIR LIFT SYSTEMS
WATER METERS

Literature on request

WORTHINGTON PUMP AND MACHINERY CORPORATION
General Offices: **HARRISON, NEW JERSEY**
Branch Offices and Representatives in Principal Cities throughout the World

CP8-7

JULY, 1938

Vol. LIII, No. 7

The American City

470 Fourth Avenue
New York

35 Cents, $2 a Year

Water-Works Underground Survey by Lima, Ohio

By E. E. SMITH
General Superintendent
and
W. P. SNOOK
Superintendent of Distribution and Water Supply,
Department of Water and Sewage Treatment,
Lima, Ohio

WHEN the authors of this article assumed charge of their offices in 1934 and 1936, respectively, although each had been in the employ of the Lima Municipal Water Department for many years previously, it became increasingly obvious that the records of water mains, valves, hydrants, and services available were not only obsolete, but incomplete and inaccurate. The only system in existence for obtaining information concerning lines and valves was a cumbersome bound volume created in 1921. This volume, exceedingly valuable because it could not be replaced, was carefully guarded in a discarded safe in the storeroom of the Superintendent's office. It contained, drawn in ink on blue line print cloth, approximately 100 sheets 16 x 18 inches and many loose sketches of additions and changes. Whenever it was consulted, it was necessary to open the safe and continue to wear out this original material. The crude methods of obtaining and keeping records of underground structures in the past made it difficult to find measurements, locations, sizes or descriptions. Previous persons responsible for obtaining and recording such information had done so without system, if at all. It was well known that, owing to this lack of system and confusion, many records of location and size of valves were faulty or existed only in the memory of old employees.

To provide comprehensive and accurate records of all underground structures; to make possible easy access to such information at more than one place; to inaugurate a system which could easily be expanded and corrected; to obtain a complete inventory of the distribution system for valuation purposes; and, above all, to do this work when "white-collar" labor was available and to some degree "free," as the Federal participation in this WPA project—all these reasons combined to suggest the project. The project was written on Form 301 in December, 1936. It was originally intended to provide employment for the following personnel for a continuous six-months period: one supervisor, one clerk, one draftsman, twelve chainmen.

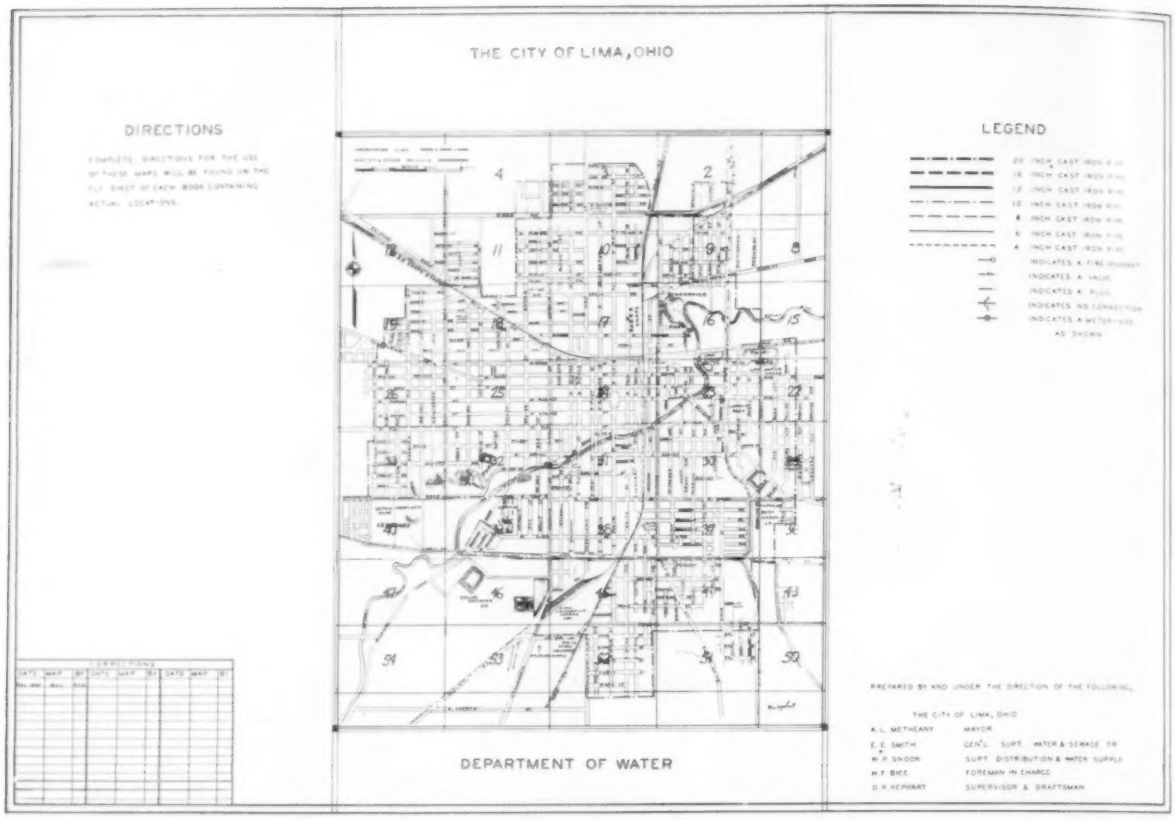
As the work proceeded, it became evident that greater efficiency would result by using fewer men for a longer period; accordingly, eight months were covered. The project received approval for $4,342 of Federal funds, exclusively labor, and $1,106 sponsor's funds, of which $431 was material and equipment and $675 labor. The sponsor, incidentally, supplied considerably more in equipment and labor on account of the importance of the work.

The project opened on April 5, 1937, with one draftsman, one office clerk, and one WPA supervisor, who also helped in the office, and two field crews of five men each.

Field Work

The first act was to sort all available information at hand and to sketch each intersection on cross-section notebook paper, size 6¾ x 3¾ inches. This was done while the draftsman prepared the maps, which were drawn from a master map of the city divided into sections equal in size, so that the sectional maps when finished would be 41 x 28 inches within the boundaries when drawn to a scale of 100 feet to the inch. This made it possible to use 42-inch tracing cloth economically.

During this preliminary office work, the field crews were schooled in the shop in the exact procedure necessary to produce the desired results. Maps, plans and data sheets were studied. Correct measuring technique was taught, and eventually the two field crews were ready for work. Equipped with data sheets, maps, picks, shovels, tapes, etc., they were placed under the supervision of Hobart Bice, a competent water-works employee of many years' experience and great familiarity with the distribution sys-



MAP NO.

INSTRUCTIONS FOR USE.

Each Map has its individual number which has a corresponding book bearing the same number. Each intersection on the map is numbered thus (5) The sheets in the loose-leaf books correspond to these numbers as well as being titled by intersections. Each object which has been measured and located has a number secondary to the intersection number and is marked on the maps in this manner: (3)——— with the straight line pointing to the object as marked on the map. Books are indexed as follows: the first number on each page and location measurement represents the map number. The second number represents the location number. Example: You wish to locate valve (3)——— at intersection (5) on Map (18) This exact location will be found in book 18, page 5 and marked 18-5-3.

In locating a valve or other object from a measurement given in these books always measure in the order given. If a valve is located 18.5 feet south and 6.2 feet west of a given object, always measure 18.5 feet south FIRST to a point, then 6.2 feet west.

On all streets not running in a true east and west or north and south direction, measurements are obtained as if they were true directions. For example, measurements

(continued)

taken on Bellefontaine Avenue; north and south measurements will be taken in a direction at right angles to the curb or paving, while east and west measurements will be parallel to the curb or direction of the street.

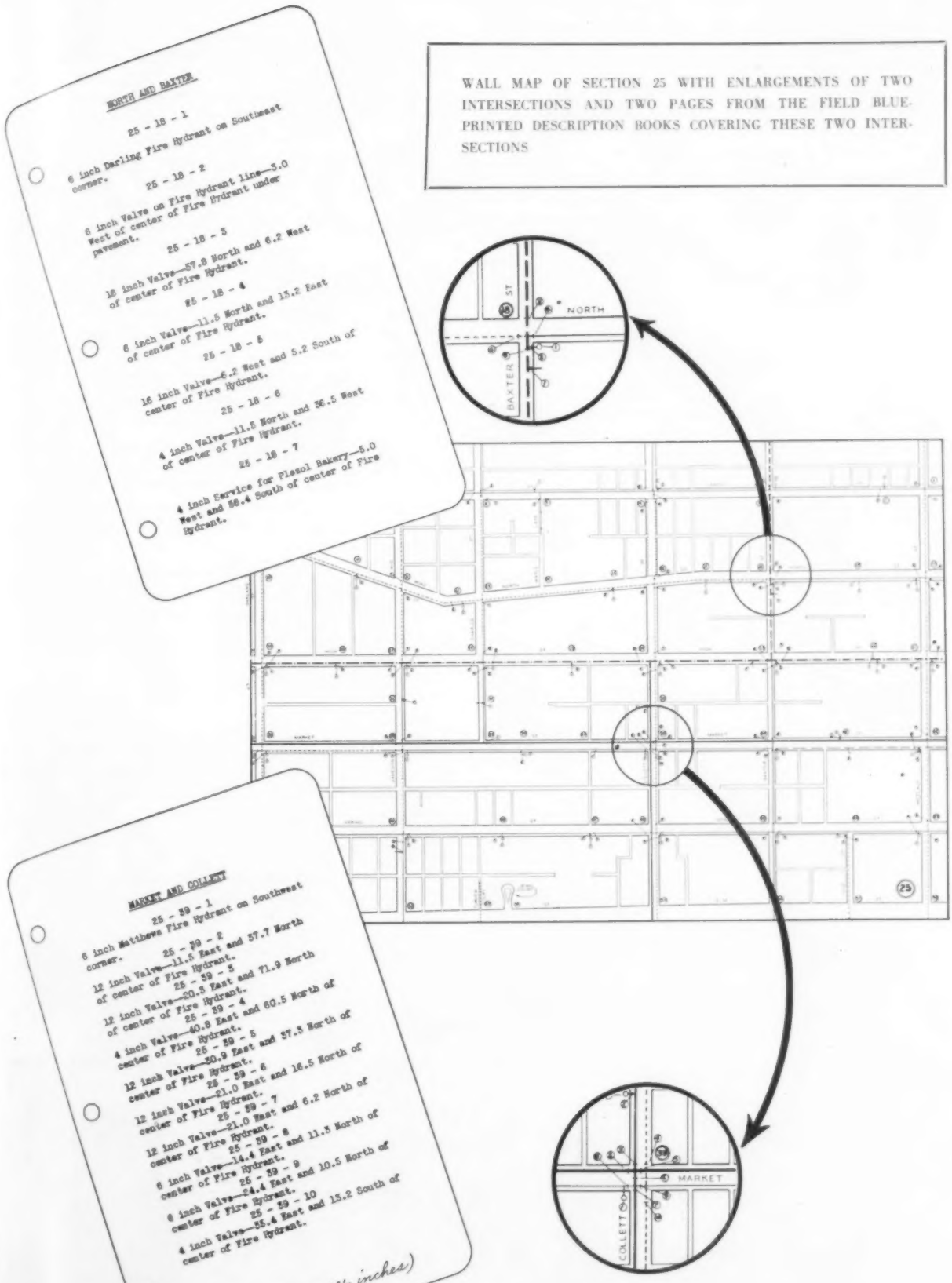
ANGULAR MEASUREMENTS are used in some cases on such streets and are direct measurements between the two objects.

All corrections, changes or objects not shown should be reported immediately to the person in charge in order to keep these records up to date.

The top of the map is always north.

THE INDEX MAP SHOWING THE DIVISIONS INTO FIFTY-FOUR SECTIONS AND TWO NOTE-BOOK PAGES OF BLUEPRINT INSTRUCTIONS ON THE USE OF THE SECTION MAPS AS SHOWN ON FOLLOWING PAGE

WALL MAP OF SECTION 25 WITH ENLARGEMENTS OF TWO INTERSECTIONS AND TWO PAGES FROM THE FIELD BLUE-PRINTED DESCRIPTION BOOKS COVERING THESE TWO INTER-SECTIONS


NORTH AND BAXTER
25 - 18 - 1
6 inch Darling Fire Hydrant on Southeast corner.
25 - 18 - 2
6 inch Valve on Fire Hydrant line—5.0 West of center of Fire Hydrant under pavement.
25 - 18 - 3
16 inch Valve—57.8 North and 6.2 West of center of Fire Hydrant.
25 - 18 - 4
6 inch Valve—11.5 North and 15.2 East of center of Fire Hydrant.
25 - 18 - 5
16 inch Valve—6.2 West and 5.2 South of center of Fire Hydrant.
25 - 18 - 6
4 inch Valve—11.5 North and 56.5 West of center of Fire Hydrant.
25 - 18 - 7
4 inch Service for Flesol Bakery—5.0 West and 56.4 South of center of Fire Hydrant.
NORTH
BAXTER
MARKET AND COLLETT
25 - 59 - 1
6 inch Matthews Fire Hydrant on Southwest corner.
25 - 59 - 2
12 inch Valve—11.5 East and 57.7 North of center of Fire Hydrant.
25 - 59 - 3
12 inch Valve—20.5 East and 71.9 North of center of Fire Hydrant.
25 - 59 - 4
4 inch Valve—40.8 East and 60.5 North of center of Fire Hydrant.
25 - 59 - 5
12 inch Valve—50.9 East and 57.3 North of center of Fire Hydrant.
25 - 59 - 6
12 inch Valve—21.0 East and 16.5 North of center of Fire Hydrant.
25 - 59 - 7
12 inch Valve—21.0 East and 6.2 North of center of Fire Hydrant.
25 - 59 - 8
6 inch Valve—14.4 East and 11.5 North of center of Fire Hydrant.
25 - 59 - 9
6 inch Valve—24.4 East and 10.5 North of center of Fire Hydrant.
25 - 59 - 10
4 inch Valve—35.4 East and 15.2 South of center of Fire Hydrant.
MARKET
COLLETT
(Page size 5x7 3/4 inches)

tem. These two crews covered approximately two-thirds of the city in this manner, each evening turning their finished data sheets to the office force, and each morning starting with new sheets. The completed sheets were typed in the office on blank notebook paper 7¾ x 5 inches and sorted into map numbers, so that the intersections appearing on each map were covered by sheets giving the exact location of each valve, hydrant, etc.

After approximately two-thirds of the city was covered in this manner, the recheck began. One field crew continued to locate the valves, etc., in the remaining one-third of the city, while the other took the newly prepared sheets and checked each measurement and number against the plat map in the field and, at the same time, measured the main line from intersection to intersection and marked it on the maps.

Office Work

As soon as the city had been completely covered, the force was reduced to only one field crew besides the office force.

The data from the blueprints were then transferred to the original tracings, and the data from the rechecked notebooks were typed on vellum, backed with carbon paper, cut to notebook size, from which blueprints were made. These prints, when trimmed and punched, were filed in notebooks and numbered to correspond to the maps they matched.

After each map and its corresponding book were completed, they were checked by Mr. Bice and the Superintendent of Distribution and Water Supply by reading the measurements, etc., and checking against the map. As each map was finished, black line prints were made for the wall case in the shop, and blueprints were made of the map for the office, and another set for field use.

Results

Thus we have a very flexible system, one that can be added to easily and changed easily. A change on any intersection means simply that a new sheet be made for the notebook of that particular intersection and the change be shown on the black line print in the shop. The tracings can be brought up to date once each year or as often as conditions require.

By filing the original tracings and the original vellum sheets in a fireproof place and using only the copies, we have avoided any chance of loss by fire, etc., and have saved the necessity of fire insurance on such records. The completed survey located, measured, and described the following:

MAIN-LINE VALVES

Size	4	6	8	10	12	16	20	
Number	348	375	147	107	69	24	39	Total 1709

FIRE-HYDRANT VALVES

Size	6	8		
Number	469	18	Total 487	Total valves 2196

MAIN-LINE PIPE, IN MILES

Size	4	6	8	10	12	16	20
Length	24.9	55.4	8.7	7.2	6.8	1.3	5.2

FIRE-SERVICE PIPE, IN MILES

Size	6	8		
Length	1.25	.03	Total pipe 112.2 miles	Total hydrants 791

Use

The system is very simple and can be used easily by even the most inexperienced employee. This article is illustrated by photostats of the index maps and title sheet, and a typical map (25) containing two intersections which are described by full-size blueprints from description book 25, as well as the two sheets of instructions for use of the maps and description books. Photographs show the map case in both closed and open positions of the counter-weighted sliding front on the wall at the Distribution Division Shop and office. The black line prints are mounted on heavy composition board, illuminated by tube bulbs immediately above, automatically off when the case is closed or the office lights extinguished. Description books are kept on the shelf above the maps.

To refer to the accompanying maps, suppose a person should want to locate the 6-inch valve on the Market Street main just west of the Collett Street intersection. First, the book number is identical with the map number and is found on the lower right-hand corner of the map. Then the intersection number for this intersection is No. 39 and is so marked in the circle. This particular valve is No. 8 on this intersection. Thus the valve location can easily be found in Book 25, page 39 and numbered on the page, and is as shown on the accompanying book page numbered 25-39-8.

Instructions for use are placed as the index leaf in front of each book in the data books. These are two blueprints glued together and form a good index leaf because of the extra thickness thus obtained.

Summary

In addition to giving work to a large number of men for a period of time, the project has incidentally provided the Water Department with an accurate picture of the condition of valve-boxes, etc. A great many valves were found to be covered with paving; valve-boxes were found as much as 24 inches below street grade. Many were found to be broken or crooked and in need of repairs. All these conditions are being corrected and providing slack-time employment for our own regular employees.

Opportunity is taken at this time to thank all WPA officials of District No. 1 in Ohio for their splendid co-operation, and Mayor A. L. Metheany of Lima for his generous aid, also to commend Hobart Bice and Don Kephart for their invaluable assistance.

In Honor of Joseph Lee

Thursday, July 28, 1938, has been designated National Joseph Lee Day. The purposes of the day are "to commemorate the life and work of Joseph Lee and to interpret the importance of community recreation." Joseph Lee devoted his life and much of his fortune to the promotion of play and recreation for men, women and especially boys and girls. He was President of the Playground Association of America, now the National Recreation Association, from 1910 until his death in 1937.

Special activities are being planned throughout the country on playgrounds, in parks, and at community centers. Programs will center around the life of Joseph Lee and the recreation movement, past, present, and future. The National Joseph Lee Day Committee, with Headquarters at the National Recreation Association, 315 Fourth Avenue, New York, has prepared for general distribution to interested organizations a special publication containing suggestions for use in celebrating the day. Special exhibits, pageants, festivals featuring sports and games that Joseph Lee loved, essay contests, and models of future plans for recreation facilities are among the suggestions which the Committee makes.

Reading Constructs a Municipal Airport

By ALBERT W. GOTCH
Planning Engineer, City of Reading, Pa.,
and
ARTHUR WALBORN
Windsor Service, Inc.

LATER this year the city of Reading, Pa., will open officially its newly constructed municipal airport. Located in the outskirts to the northwest of the city, the port is less than a mile from the city limits, and only three miles from the business and hotel district, a matter of ten minutes by automobile. The Bernville Road, on which the airport is located, is being reconstructed by the State Highway Department; so that the port will have a splendid approach.

The airport tract consists of 185 acres, of which about 125 are being developed. It lies on a natural "turtle-back" plateau, which facilitates surface drainage, and results in complete freedom from obstructions. The runway pattern is triangular, the principal runway running NW by SE, the remaining two EW and NS. The triangle is bisected by a taxiway. The landing strips have a minimum width of 500 feet, and are respectively 3,600, 2,900, and 2,500 feet long. The landing strips have bituminous paved runways 100 feet wide, which are respectively 3,000, 2,400, and 2,100 feet long. The taxiway through the triangle, and others leading into the hangar and station area, which lies opposite the center of the principal runway, are 50 feet wide. Aside from the paved sections, the entire port will be turf, and will be fenced and properly lighted.

Conducted as a WPA project, construction began in the summer of 1936. The work included considerable grading, which required moving over a half-million cubic yards of earth and rock.

While the Reading port can be classified only as an intermediate port, recognized authorities hold that it is adequate in size for the community it serves. Its elevation in relation to the surrounding ground, and its freedom from obstructions, which make a flat gliding angle possible, in effect add many hundreds of feet to the landing and runway areas.

Even though the port will serve an important industrial metropolitan area of 175,000 population, and a regional area harboring a population of 300,000, it is to be conceded that it will probably never be a leading air terminal, since it is less than an hour by air from the large terminals and bases along the Atlantic seaboard. Shuttle planes will probably supply the bulk of the transportation in and out of the port, to connect with the sky giants, that are now being built, at the large terminals and ports on their courses. The city has contracted for the construction of a new hangar building and lean-to with

CONSTRUCTION OF THE RUNWAYS AT THE NEW MUNICIPAL AIRPORT AT READING, PA.
Above—General view of construction operations. Left—French drains in subgrade under runways. Center—Machine spreader putting down plant-mixed surface of emulsified asphalt and slag. Right—Close-up of finished runway surface

shop, office and station facilities.

Runway Construction

The runways consist of an 8-inch base and a 2-inch wearing surface. Crushed slag and broken stone were used in the base course, spread to an 8-inch depth and compacted. The compacted base was then choked with limestone screenings from ¼-inch to dust in size, which were thoroughly broomed while the rolling progressed, so that a maximum amount worked into the base.

The wearing surface consisted of one-course emulsified asphaltic concrete compacted to about 2 inches and sealed with three applications of emulsified asphalt, produced by Windsor Service, Inc., of Reading, using the Texaco process. The pre-mixed emulsified asphaltic concrete consisted of graded, crushed slag from a local slag bank, mixed with a stable grade of emulsified asphalt. The mixture contained approximately 3½ per cent of bitumen.

The truck haul was about 5 miles from the plant to the job. Spreading of the mix on the runways was accomplished by means of traveling mechanical spreaders. Time was allowed for the emulsified asphalt to break and develop a degree of stability which would permit rolling without creeping. As the rolling progressed, the surface was checked for irregularities, and corrections were made by the addition or removal of the mixture. Rolling continued until the airport construction superintendent was satisfied that proper compaction had been effected.

A seal coat of emulsified asphalt was then applied at the rate of about 0.25-gallon per square yard, and clean commercial ½-inch crushed stone was spread by means of a mechanical spreader at approximately 20 pounds per square yard. Thirty minutes to an hour were allowed for the emulsified asphalt to break, after which the cover material was rolled into the voids. A broom drag was used during the rolling to insure uniform distriibution.

A second seal coat of emulsified asphalt was applied at approximately 0.3-gallon per square yard, and this application was covered, as described above, at the rate of about 15 pounds of stone per square yard. This cover material was also rolled and broomed, and then a final application of emulsified asphalt was made at the rate of 0.25-gallon per square yard and covered with 8 to 10 pounds per square yard of commercial ¼-inch chips. This final cover was rolled and broomed until the maximum amount had been firmly embedded and the surface presented a dense, well-compacted, uniform texture.

It is felt that this type of construction has resulted in a runway which will give good service. Because a high percentage of bitumen is retained in the upper strata of the wearing surface, weathering will be greatly retarded. Intelligent maintenance in the form of light surface treatments, applied at intervals determined by the degree of weathering, should be accepted as normal procedure, similar to periodic painting of fences or buildings.

A brief explanation in connection with the slag employed as aggregate in the Reading runways may be of interest. At Temple, Pa., about five miles from the airport, approximately 1,000,000 tons of air-cooled blast furnace slag had accumulated incident to the operation of a blast furnace in iron production from 1867 to 1921. Utilization of this material in road building began in 1931, and since then about 200,000 tons have gone into the construction of roads within a 30-mile radius of Temple. The average weight of this slag is 80 pounds per cubic foot.

A series of twelve holes are bored into the slag bank by a well-driller to a depth of 12 feet, filled with black powder and ignited with a blasting battery. Approximately 5,000 tons of material are loosened at a time by this method. The crushing and screening plant, erected alongside the bank by the Temple Slag Co., has a capacity of 750 tons a day.

Personnel

To assist in the construction and operation of the Reading airport, a five-man Airport Commission was created by the City Council. The Commission meets weekly and disposes of problems promptly as they arise. County Commissioner Amos Lesher is Chairman, and Melvin H. Nuss, Secretary. Judge Edgar Richardson, Paul S. Keeler, and Donald Beaumont are the other members.

Administratively, the airport is in the City Department of Public Affairs, of which Mayor J. Henry Stump is the Director. Design, specifications and general supervision are supplied by the Bureau of City Planning, under the Planning Engineer. Earl F. Heist is Supervising Engineer in the field.

The project has provided continous employment for 150 to 300 men, under the superintendence of Walter S. Faber, and when completed will have cost over half a million dollars.

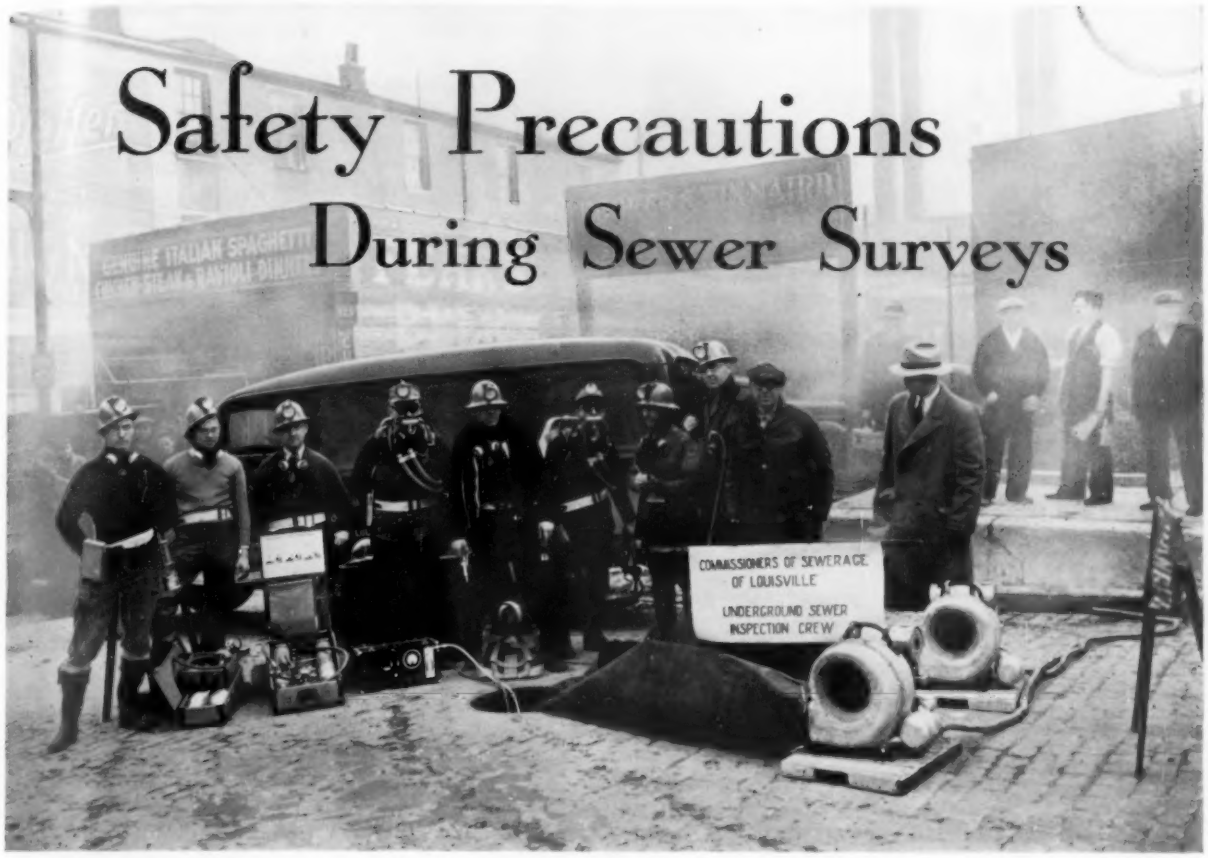
BUILDING ONE OF THE NEW SLAG RUNWAYS AT THE READING AIRPORT

This project is somewhat unusual in that the runway surface consists of plant-mixed emulsified asphalt. Slag was also used as a foundation for the runway. FB-1 Texaco emulsion was used for the mix, which was spread with an Adnun paver

Is your city getting its share of the new PWA and WPA funds?

(See page 5 of this issue)

Safety Precautions During Sewer Surveys



Methods and Equipment Used in Louisville, Ky., During Investigation of Old Brick Sewers

By WOOLSEY M. CAYE
Technical Engineer, Directing the Engineering Department of the Commissioners of Sewerage of Louisville, Ky.

DURING the latter part of January and the first part of February, 1937, approximately two-thirds of the city of Louisville was inundated by the waters of the record Ohio River flood. Streets of the city were flooded in places to a depth of over 19 feet, subjecting some of the sewers to internal hydrostatic heads of 30 to 40 feet.

As flood waters receded, numerous cave-ins of streets occurred. These were of varying magnitude. Immediately rumors became rife that the sewers in these localities were failing, and grave apprehension was felt for buildings, especially in the downtown district. Upon request of the City Administration, the Commissioners of Sewerage undertook the investigation of the main trunk sewers of the city within the inundated areas to ascertain conditions, repairs necessary, both immediate and permanent, and their cost. As a result, 28.31 miles of sewers were entered, traversed, carefully measured, inspected and photographed. The sizes of these sewers varied from 11 feet 9 inches internal diameter to 30 inches internal diameter. They were the old brick sewers of the city; their age ranging from 38 years to over 87 years, the older sewers reported as constructed prior to 1850.

Protection Against Explosions

The present Commissioners of Sewerage having constructed sewers for the city since 1920, the possibility of grave danger from explosion, asphyxiation and deadly gases in the sewers was known. Therefore, one of the first considerations in undertaking this survey was the safety of engineers who would be called upon to make the inspections, as well as protecting the sewers themselves.

As a result of the flood, a number of gas mains in streets and pipes in private property of the flooded area had broken and, while the escape of gas was promptly stopped by the gas company, it was feared by the Commission that some of the escaping gas might be lurking in the sewers that were to be inspected. Should this be true, and if proper precautions were not taken, fatalities and also danger to the sewers would most surely result. Fires or explosions occurring in the sewers could easily reach buildings, homes and property connected to the sewers through the individual house drains, especially if the building contained any of this leaking gas, and therefore not only would the lives of engineers in the sewers be endangered, but persons in offices, buildings, factories and

CLOSE-UP OF A FIELD PARTY IN THE LOUISVILLE, KY., SEWER SURVEYS, EQUIPPED WITH SAFETY EQUIPMENT

Showing oxygen breathing apparatus, gas testing instruments, Inhalator for resuscitation, Skullgard hats, safety lamps and goggles with respirators

homes would also be placed in jeopardy, not to mention the possible fires which might be caused in the property connected to the sewers. A discussion of explosive, poisonous and asphyxiating gases which were known to have been found in sewers, in addition to the gas from gas mains previously mentioned here, will not be attempted other than to say that this added hazard itself was believed to justify taking the precautions hereinafter described.

Furthermore, the city having just passed through a very trying experience, it was highly essential that hysteria should not be aroused, which would most surely happen if any sort of accident should occur as a result of the sewer inspection. Therefore, in preparing for the underground survey of the sewers it was assumed that deadly, as well as explosive gases, might be encountered at any time. Likewise, it was assumed that the "air" in the sewers might be deficient in oxygen for the support of life, and in lesser cases insufficient to permit efficient and rapid collection of data in the least time, which was very essential. No attempt will be made to discuss the data sought or the method of obtaining this information, except as these procedures are related to safety precautions observed in making the underground inspections of the 28 miles of sewers.

Organization

City officials, once the problem was undertaken by the Commission's Engineering Department, began asking for conditions of these old sewers in every section of the city; likewise governmental agencies, coming to the rescue of Louisville, apparently must know "all about" the sewers "before anything could be done." This made orderly organization a rather difficult problem; however, in the face of this condition a method of procedure which included a definite safety policy was formulated, and some thirty engineers, including office assistants, were employed, equipped and given instructions and training in safety procedure and the use of safety equipment before being allowed to proceed with the inspection. Members of the Commission's permanent engineering staff having had previous training in safety methods and equipment, during their former routine work, were placed in key positions of the underground survey crews, and this was of great aid and contributed largely to a happy outcome of the work.

For collecting the data and ascertaining the conditions of the old brick sewers, two units or parties of engineers, each equipped with an auto truck, and safety equipment, and consisting normally of 13 men per party, were utilized throughout the investigation for making the inspections of the sewers. The first party was fully equipped, given some training and placed in the field in ten days after the work was ordered to proceed by the Commission. The second party was placed in the field, after likewise receiving equipment and training, about three weeks later.

Immediately following the authorization of the sewer inspection, it was decided that safety precautions along the following lines should be observed. The basic precaution was that all equipment to be taken into the sewers must be fully gas-proof, and metal objects must be excluded as far as possible so as to eliminate the possibility of creating sparks which might ignite inflammable gases.

Procedure

The sewers to be inspected were divided into sections according to manhole locations; a manhole to be at each end of a section. Isolation of a section from the remainder of the sewer was to be secured by placing brattices immediately upstream and downstream from the manhole, after which a complete change of air in the sewer was obtained by power blowers forcing air through canvas ducts into the sewer through one manhole and allowing it to escape through the other, this change of air taking place before the crew entered the sewer. For this purpose two Homelite portable, gasoline-driven blowers of 2,000 cubic feet per minute capacity, with 15 feet of canvas air duct, were furnished each party. The blowers were operated by a blower-man and an assistant who also acted as a general handy man for the party. These men also had other duties hereinafter described.

At the manhole from which the air was escaping from the sewer, there was stationed a gas-testing engineer, equipped with the proper gas-testing apparatus. It was his duty to test the air coming from the sewer periodically, at intervals varying for the different tests from only a few

A PORTION OF AN UNDERGROUND CREW OBTAINING MEASUREMENTS OF A CROSS-SECTION OF OLD BRICK SEWER

minutes apart up to one hour apart, depending on circumstances, and to record the readings of the instruments. This was to indicate the condition of the air in which the underground crew would work. The gas tests were made as often as practicable if a reading of any instrument indicated an unsatisfactory air condition approaching. It was the further duty of this air-testing engineer not only to record instrument readings periodically, but to sound an alarm when gas-testing instruments indicated the approach of an unsafe working condition. This alarm made it mandatory for all workers to leave the sewer immediately. The air-testing engineer was furnished with a combustible gas indicator, calibrated for petroleum gas, a carbon monoxide indicator and a hydrogen sulphide detector. In addition, this engineer was responsible for the first aid kit, which contained first aid drugs and bandages enclosed in a watertight case, and ready for immediate use. He, as well as the engineer in charge, or chief of party, was trained in first aid and in resuscitation. It was mandatory that any one receiving even a scratch must immediately submit the injury for first aid treatment. In case of serious injury or asphyxiation, one man of the ground crew, previously instructed, was to immediately search for and obtain the nearest physician in the neighborhood, and also to call for the police emergency rescue squad for assistance. In addition to the gas detector instruments, which were in operation at the ground surface, the engineer in direct charge of men working underground was equipped with a small portable carbon monoxide detector with spare detector tubes. This he used periodically, especially in the event that certain sections of the sewer might be potential pockets of gas. These tests assured him that he was not leading his men into bad air. Also, each underground crew carried an aluminum Wolf flame safety lamp, key locked, for indicating pockets of explosive gas, if such should be encountered, and for showing whether the air was deficient in oxygen. This gas apparatus carried underground was issued to pre-designated men and gave assurance to all men working in the sewer that, even though the precautions taken at the ground surface were functioning, they were not encountering pockets of bad air in the sewer.

Removed from the auto truck and set on the sidewalk or street surface at all times under the direction of each engineer in charge was a MSA Inhalator for resuscitating asphyxiated persons. This Inhalator was equipped with an auxiliary attachment for treating a second patient at the same time. Spare oxygen cylinders for the Inhalator were carried by each party.

Further Precautions

Not only were these underground crews being sent into the sewers where bad air might be encountered, but they were entering brick sewers of great age which had been subjected to great internal pressure during the flood. Therefore, it was most necessary that pre-arranged methods of rescue be adopted. Should blowers fail to function and bad air pass into the bratticed or isolated sections, asphyxiations might be anticipated. The age of sewers, the cave-ins of streets at the surface, and the flood to which the sewers had been subjected, indicated that sewer collapses might be anticipated. To provide for possible rescue work, two complete sets of McCaa oxygen breathing

A SEWER FOUND NEARING COLLAPSE, SHOWING ENGINEERS WITH SAFETY EQUIPMENT WORKING IN CRAMPED SPACE

apparatus with additional tanks of oxygen and cans of Cardoxide were issued to each field party. The handy men were especially instructed in the use of this breathing apparatus and in rescue methods in the event that men were caught in any of the sewers. These men were especially chosen for this work, being construction men of broad experience and personally known to engineers of the Commission. Also, the air-testing engineer and the engineer in charge were given instructions in the use of this apparatus, as well as being required to practice the removal of the apparatus from their cases and assisting the rescue men in donning the apparatus and entering the sewer if such rescue was to be undertaken. Frequent drills were held to keep all the men of the ground crew proficient in rescue operations. Fortunately, no occasion occurred where use of the breathing apparatus was required. This breathing apparatus would permit a man to work in any kind of air; in fact, in a deadly gas completely devoid of oxygen, for two hours. At the expiration of this time a change of oxygen tank and Cardoxide can must be made, when the worker may return for two more hours.

Exploration Parties

The personnel of each underground survey party normally consisted of thirteen men, five of whom ordinarily remained on the ground surface, and eight of whom were required for compiling data inside the sewer being inspected. Composing the ground crew was the engineer in charge, who was in charge of the whole of the work, the gas-testing engineer, whose duties have largely been explained, the blower operator and two handy men. Likewise, their duties have previously been described. The underground crew consisted of two chiefs-of-party, two instrument men and four rodmen or chainmen. The instrument men ran the surveying instruments, and the remaining men operated the "sunflower" instrument used in establishing the existing cross-section of the sewer, and secured and recorded conditions of mortar, brick, missing lining, inlets and other required data. These underground engineers were equipped with rubber waders extending up

to the armpits, rubber jackets extending to below the waist line, rubber-dipped cotton gloves, "Shake and Nod" goggles, Bakelite Skullgards, upon which was mounted a gas-proof Edison electric cap lamp of 66 candlepower, the current for this lamp being supplied by a gas-proof storage battery carried on a 2½-inch miner's cotton woven safety belt. Certain of these lamps of the underground crew were fitted with reflectors giving a flood distribution of light, while others gave a beam concentration. Each had its special use and at all times both were of advantage. Also, members of this crew were furnished with "permissible" flashlights with dry cells, which were safe under certain conditions of explosive gases and were conveniently used as a supplement to the Edison lamps. The batteries of the Edison lamps required recharging every other day, which was done with equipment specially designed for this purpose and installed at the office of the Commission. This required two batteries for each lamp in the field, with a few extra batteries for emergency. Each man was equipped also with a Comfo chemical cartridge respirator which eliminated the breathing of obnoxious and nauseating air. All this safety equipment was purchased by the Commission from the Mine Safety Appliances Co., of Pittsburgh, Pa., and is of the type used in mine safety and rescue work. This company supplied the safety equipment on exceedingly short notice, and the equipment's operation, so far as tested by this work, proved exceedingly satisfactory.

In addition, each crew had life-lines and life-belts, extra rope, crowbars, picks, shovels and two 50-foot rope ladders, so that each party going into the field was completely equipped for practically any eventuality. Shortly after work was begun in the field, it was found the ground crew was also exposed to quite a hazard—vehicular traffic using the streets. City police, and later barriers with proper danger signs, solved this problem. This was the one item which had been overlooked in drafting the original Safety Rules.

Precautions Warranted

To one who is unfamiliar with work in or around dangerous air, the equipment used and precautions taken during the survey of these old sewers may seem unnecessary; however, the survey was completed without a single serious accident, though at times dangerous air was encountered, in some instances before the men entered the sewer, and in fewer instances while they were working in the sewer, in which cases the men were ordered out. In one instance one of the underground crew tripped in a large chamber of a sewer, fell about 16 feet and was undoubtedly saved from serious injury by his Skullgard. He reported back to work the next day. Minor scratches, cuts and abrasions were experienced by some of the men, but no infection developed from any, owing probably to prompt first aid treatment. No serious sprains or broken bones, asphyxiations or accidents of any other character were experienced, though practically all manholes were devoid of steps, forcing entrance and exit by means of the rope ladders.

One near-serious accident, however, was just averted by prompt action of the engineer in charge and previous precautions taken of requiring orderly and systematic exit of men from sewers. One crew was working in a sewer of small diameter, its outlet being into the river quite a distance away and submerged. The crew was measuring arch deflections above the pooled sewage. This particular sewer was one of the oldest inspected, and its capacity is entirely inadequate to drain away rainfall as fast as this water reaches the sewer, without placing the sewer under a head. While the underground crew was at work, a moderate rain started falling, and a more intense rainfall occurred upstream from the point where the party was working. As a result of the rain and the insufficient capacity of the sewer, an exceedingly rapid rise in the sewer occurred, nearly catching the men before they reached the manhole, which was a considerable distance from them. Presence of mind of the engineer in charge, a man of long sewer construction experience, was the one factor which probably saved the lives of some of the men of his party in this emergency. When they were told to leave promptly, an orderly exit was made, the water reaching the crown of the sewer as the last man was coming up the rope ladder. Almost immediately the sewer began working under a head, the water rising in the manhole a considerable distance above the crown of the sewer.

Standard Safety Rules

Even prior to the undertaking of this underground survey the Engineering Department of the Commissioners of Sewerage had in force certain iron-clad rules in regard to entering sewers in operation. These may be briefly stated as follows: No sewer in operation shall be entered until at least two manholes have been uncovered and left so standing for some time; tests of the sewer air with a mine safety lamp shall be made, and if there exists any question of safety, no employee of the Commission shall be allowed to enter until an air blower is obtained and a change of air in the section of the sewer in question is created. Furthermore, regardless of conditions, each man entering sewers shall have a Burrell All-Gas Safety Mask available on the ground and ready for use. Also, engineers entering sewers must have handy, in case of emergency, a 200-foot life-line, and this line shall be attached to any man when conditions in the sewer are any way hazardous, after which at least two men shall handle the line at the manhole.

Enviable Accident Record

During the life of the present Commission, which has extended from December, 1919, and within which $17,000,000 has been expended upon sewer construction for the city of Louisville, numerous sewers have been entered and inspected to a greater or lesser extent. In this work and in the work of construction which has been done by contract, and including the underground sewer investigation, not one serious accident has occurred to any of the Commission's employees.

The underground sewer investigation was made under the immediate direction of the writer, assisted by a member of his staff, C. F. Johnson, Senior Engineer, who supervised work of the field parties and directed office compilation of all data collected. W. T. Newhall, Senior Engineer of the Commission, was the engineer in charge of the field party which came very near being trapped in the old sewer mentioned in the body of this article.

Complete Machine Accounting for a Small Municipal Utility

By BURTON N. SPARKS
Village Clerk, Tupper Lake, N. Y.

THE Tupper Lake municipal electric distribution system, grossing $90,000 from 1,600 customers, while not one of the large utilities of the state, has completely systematized its accounting with the use of machine aids, and has secured outstanding satisfactory results.

When the Public Service Commission instituted the Uniform System of Accounts for Municipal Electric Utilities, we sensed the benefits of the new records and the new operating and financial information that would be available. Only by tedious and costly analysis of old transactions had we been able to get, if at all, the accounting data needed. Most of the municipal utility managements making up the active group of the Municipal Electric Utilities Association realized that there was no established ready-made system. The Association engaged Messrs. Barker and Wheeler as advisory engineers and accountants to protect its interest in all matters of common bearing, and made these services available to individual places which wanted them. We retained this assistance to develop engineering and accounting procedures best meeting the Commission requirements and our local conditions.

We were soon convinced that in order to keep properly all the control and detail accounts for capital, expense, clearing and suspense amounts, continuing-property record (meaning by that a perpetual-inventory and appraisal), statistical records and service analyses, it would be necessary to have four more clerks or else go to machine accounting and other well-tested mechanical aids to give automatic checks and proofs, fewest re-copying and transfer operations, and minimum skull- and knuckle-beating.

Every transaction which is finally recorded in our General Ledger comes from one of six basic sources: (1) issues of materials; (2) receipts of materials; (3) payroll charges; (4) vouchers for materials and services; (5) special journal entries; (6) or revenue accounting summary.

Issues of materials from storeroom are recorded on Debit Tickets, made out in duplicate and so routed that transactions are immediately recorded in the control accounts in the General Ledger. If the issue pertains to construction work in progress, the duplicate or carbon copy finds its way into the Work Order file affected, and is retained there for future analysis and cost development when the job is completed; all without the necessity of laborious copy operations in order to accumulate the costs of the project. The original is recorded in a Stores Debits Summary and is then filed in numerical order in a permanent register for future reference. This Stores Debit Summary records the date, number of the ticket, total credit to Material and Supplies, total credit to Stores Clearing Account, and the distribution of the total charges to the Operating Expense Accounts or numbered Work Orders. Receipts of either new or salvaged materials are recorded on Credit Tickets which are made out in duplicate and are handled and recorded through the same routines as the Debit Tickets.

Payroll charges and distribution of the men's time are recorded on Time Reports, also made out in duplicate. The original is first recorded in a Payroll Summary which shows the date, Time Report number, total credit to Pay-

ADDRESSOGRAPH FOR BILLING, AND BOOKKEEPING MACHINE FOR ALL ACCOUNTING

roll Suspense, total credit to Transportation Clearing, and the distribution of the total charges either to Operating Expense accounts or to numbered Work Orders. The original report is then used to make up the weekly payroll and is finally filed in numerical order in a permanent register for future reference. The carbon duplicate, if the work is an operating expense, finds its way into a monthly expense file; if the labor is on a construction job, the duplicate finds its way into the proper Work Order file for future analysis of unit costs when the job is finished.

Purchases of material and equipment are recorded on Village Vouchers or payment checks which are recorded in a Voucher Register and Summary which supplies the proper distribution to Operating Expense Accounts or numbered Work Orders.

At the end of the month the summaries of these first four sources of information are used as the basis for the entries to the General Ledger, and as they are on self-summarizing forms it is only necessary to add the columns and check the cross totals to prove all postings and obtain a complete distribution by account or Work Order for posting through the bookkeeping machine. Special items, such as charges to reserves, or to contributions for extensions, etc., are handled on special journal-entry forms which become the basis for a machine posting to the General Ledger. Revenue accounting as carried into the General Ledger comes from an analysis of monthly kwh billing which will be described in a later paragraph.

Customer Billing and General Accounting

It was necessary to have an accounting machine which would handle both the General Ledger posting and the consumer's billing and accounting. Accordingly, our engineers and accountants designed a set of routines and prepared specifications for a complete motorized accounting-machine set-up, called for propositions, and finally purchased a Remington-Rand Model 85.

This machine provides a system of "line proof" that makes it impossible for an operator to go through a complete run of postings only to discover that somewhere along the line he has made an error which he must go back and pick up for correction. The machine locks, and stops the operator, when an error has been made, and therefore the error must be immediately corrected. It is especially easy to operate the machine, and even an inexperienced operator has constant visual proof not only that he has picked up his previous balances correctly but that all the debit and credit entries balance at the end of any particular posting run. It is also possible to pick up totals of a sub-series of individual postings in order that they may be carried to the related control account.

Our Continuing Property Record and General Ledger have approximately 760 ledger cards, exclusive of customers' accounts, and it can readily be seen that if it were not for the elimination of copy operations due to machine accounting as well as for the automatic proofs provided, it would be necessary for us to hire several additional employees in order to meet the requirements of the Public Service Commission.

The Department supplies electric service to approximately 1,600 consumers. The meters are read once each month by two meter readers in three days. The meter reader places the new meter reading in the meter book and extends the consumption. This consumption is used by the billing clerk and checked by the machine automatically.

Our customers' ledger record is a sheet accommodating 25 accounts. The customer's name, address, and account number are listed on the register sheet by an Addressograph equipped with a listing device—at the rate of 65 accounts per minute, including an allowance for the time required in changing sheets and plate drawers.

The customer's bill is also addressed in advance, and the form is so designed that the column spacing is identical with the spacing on the register sheet. In order to change the bookkeeping machine from General Ledger to billing it is only necessary to shift the position of the totalizers and replace the stop bar with a special bar for consumers' billing and accounting. The billing information is placed on both the bill and the register sheet in the same operation, and the register sheet is distinctly a by-product of the billing operation. This register is particularly satisfactory as a Customers' Ledger record because it shows an exact mechanical copy of every figure which appeared on the bill sent the customer, and there need never be any doubt that a duplicate bill issued from this record will agree with the original bill.

The register sheet, with a sheet of carbon, is inserted in the machine, and the bills are front-fed into a chute to positive end stops; and as each bill is made out, the carriage automatically returns and spaces up for the next bill. The present and previous meter readings are entered in the proper columns, and the amount of kwh consumption, as computed by the meter reader, is copied in. At this point the machine provides a mechanical proof that both correct meter readings and correct consumption have been accurately transcribed from the meter book. The current charges for the particular consumption are copied from a billing chart, and the arrears and the total amount due are mechanically computed and extended in their respective columns. Separate totals of both consumption and charges are automatically accumulated, and these totals are cleared at the bottom of the page or at the end of a route. Billing arrears with a machine while doing the current billing provides a completely machine-written and mechanically computed bill, and the accumulation of the total arrears provides positive proof that all arrears have been brought forward correctly.

A complete analysis by the various rate schedules and classes of service is made from the register sheet for number of bills, rate steps of consumption, and money. This is summarized in space left at the bottom of the sheet, and a recapitulation of the sheet or route totals is made on a grand summary which provides the basis for the entries to the revenue accounts in the General Ledger.

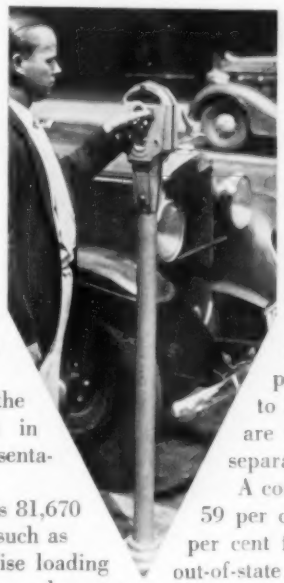
Through the installation of these routines and system, we have been able to create more detailed information and more complete records in our Municipal Electric Department than we have ever had before, without any new employees in our office. It has also been possible to have on short notice at all times complete information on revenues, operating expenses, rate base and rate of return on our investment.

Results of Norfolk's Parking Meters

A Statistical Study of Parking

By L. W. TAZEWELL
Director of Traffic Survey, Norfolk, Va.

THE unchangeable basic condition on which any parking study should start is that in every area there is a definitely limited length of curb that is available for parking purposes. The length divided by the curb space required by each car gives the number of cars that can be parked at any one time. This curb capacity multiplied by the number of parking hours to be regulated gives the number of car "space hours" for the area. This is a fixed quantity and can be used as a criterion by which to develop the arguments for and against the installation of meters.



On February 25, 1937, on the basis of the findings of a parking count, Norfolk put in operation 246 Dual parking meters on representative streets of the central shopping district.

The total curb length in the shopping area is 81,670 feet. Certain physical and legal prohibitions, such as sidewalks, bus stops, passenger and merchandise loading zones, taxicab stands, driveways and fireplugs, decrease the curb space available for parking to 57,606 feet of parking curb space, which is divided as follows:

No parking	20,968 feet
No parking 7 A.M. to 7 P.M.	2,518 "
Restricted time parking	20,799 "
Unrestricted parking	19,321 "

Of the restricted time parking, 4,920 feet, or approximately 24 per cent, is now taken up by parking meters, this representing 246 meters at 20 feet per meter. This area will hereafter be referred to as the "metered area." The increased turnover in cars, due to metering, is shown in the table below.

CARS PER SPACE DURING 9 HOURS

	Before Meters	With Meters	% Increase
Granby Street			
City Hall to Market, east side	8.0	10.1	26
City Hall to College Place, west side	6.7	12.6	88
Market to Freemason, east side	6.9	9.9	44
College Pl. to Freemason, west side	7.8	12.4	60
Freemason to Charlotte, east side	4.2	5.8	38
Freemason to Charlotte, west side	3.8	5.5	45
Granby Street	6.2	9.7	57
Brooke Ave.—Boush to Granby, both sides	4.6	9.1	98
Tazewell St.—Boush to Monticello, south side	6.6	10.4	58
Market St.—Granby to Monticello, both sides	9.5	13.4	41
College Pl.—Boush to Granby, north side	7.1	10.4	46
Freemason St.—Boush to Monticello, east side	3.4	5.4	59
	5.8	9.0	55

In studying the above results it should be remembered that where the "non-metered" counts were made, vehicles on Granby Street were parked almost bumper to bumper, occupying anywhere from 14 to 20 feet of curb space. When the metered counts were made, the curb had been marked off in 20-foot spaces and additional "No Parking" areas had been established at the ends of blocks to allow free pedestrian crossing. It is estimated that the available total curb capacity has been reduced by at least 25 per cent.

The total percentage of increase in the number of different cars parked for the entire metered area is 55 per cent.

Of all cars parked in the metered area, 37 per cent of them parked legally on unexpired time of preceding motorists. The free parking in the various blocks varies from 30 to 56 per cent and averages 37 per cent. These are minimum figures, as indicated by the results separated for each meter.

A count of cars parked in the metered area showed 59 per cent Norfolk cars, 22 per cent county cars, 7 per cent from elsewhere in the state, and 12 per cent out-of-state cars after the meters had been installed for one month.

Increase in Meter Patronage

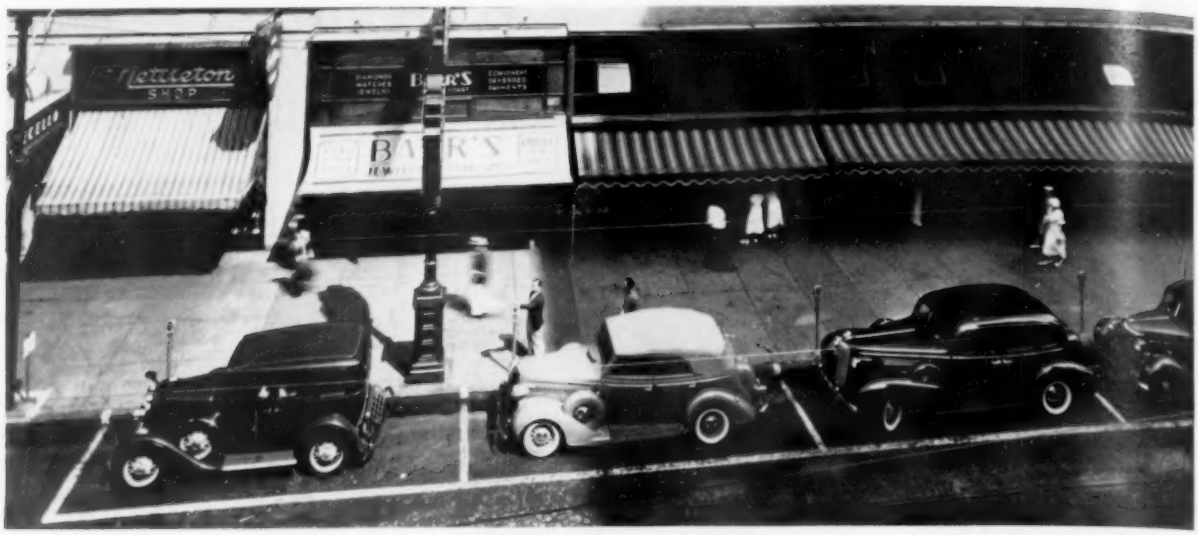
As is the case with all innovations, it takes some little time for the public to appreciate the advantages or disadvantages. With the parking meters, a count made of the collections of each meter showed an average increase of 10 per cent.

Enforcement of Parking

Metered Area.—As before stated, the 246 meters in this area take up 4,920 feet of curb space. This space is patrolled by one traffic officer on a three-wheel Harley-Davidson motorcycle, who makes a complete circuit of the area in 20 minutes, tagging all cars that are shown by the parking meter to be parked overtime. This inspection is considered unnecessarily intensive, and it is believed that *one officer can acceptably enforce parking over at least* 500 *meters.*

Non-Metered Area.—The method used here is to make a round of the curb, chalk-marking tires of cars parked, and then to make a second round, tagging cars that are chalk-marked. This area includes approximately 16,000 lineal feet of curb space. It is divided into six districts of about the same curb length, and to each district is assigned one officer on foot, patrolling from 9 A.M. to 6 P.M., which is the operative time of the parking meters.

It was desired to make a count in the non-metered area that would reflect the true situation as to parking regulation and would parallel as closely as possible the metered area. To this end, a district was selected contiguous to



ORDERLY PARKING IN NORFOLK, VA.

the metered area and lying just south of it. This area is one of six set up by the Director of Public Safety to handle the enforcement of 60-minute non-metered parking in the shopping district and, like the other five, is patrolled by one officer on foot.

The field data were gathered by six checkers, who patrolled each foot of curb every 15 minutes. The license number of each parked car was taken, and it was noted if the car had been chalk-marked by the patrolling officer. Instruction was given to note any car that had been tagged for overtime. Tables were derived from the field notes to show the following:

1. Number of cars parked
2. Number of cars parked overtime, and length of time each car parked
3. Number of cars tagged
4. Number of cars chalk-marked and length of time each car parked *before* chalk mark was placed on tire
5. Number of cars not chalk-marked, and length of time parked *without* any chalk-marking

Two checks were made on May 14 and on June 25, 1937. The first check ran for only 2½ hours, because it rained and enforcement ceased, since it is impossible to chalk-mark the tires when wet. Summary figures are as follows:

Total number of cars	950
Number of cars tagged	5
Number of cars overtime	347
Number of cars chalk-marked	201
Number of cars not chalk-marked	749

In order fairly to evaluate the figures derived, it should be borne in mind that the area analyzed is typical of the six set up to enforce non-metered parking, and the results can be assumed to represent the situation of restricted-time parking regulation in all parts of the city exclusive of the metered area.

1. Only 5 parking tickets were given during the day, although 347 cars parked overtime. Of the 950 cars checked, 36.5 per cent parked overtime, and these cars accounted for 67.9 per cent of the total vehicle hours. Two cars parked between 8 and 8½ hours without receiving a ticket.

2. Only 201, or 21 per cent of the 950 cars checked, were chalk-marked. Of these 201 cars, 55.6 per cent were parked over an hour before being marked.

3. 749 cars, or 79 per cent, parked a total of 757 vehicle hours without being chalk-marked.

4. Field checkers reported that cars were repeatedly moved to nearby positions when owners noticed chalk marks.

5. Field checkers reported that chalk marks were rubbed out in several cases.

6. It is possible for an officer to make only two double round trips per day.

7. On this basis it would take four officers to approximate an hourly inspection.

8. On May 14, a check was made in this same area, which was terminated by rain after 2¼ hours. It is an example of long-time parking that 443 cars were counted in 2¼ hours and only 950 in 9 hours.

Parking Tickets

An analysis of parking tickets was made covering the first month of operation of the parking meters. From February 25 to March 24, 1937, 1,067 tickets were turned in at the Traffic Bureau for overtime parking, as follows:

	No. Tickets	Per Cent	Curb Feet	Tickets per M Feet	Per Cent
Metered area	471	44	4,920	96	72
Non-metered area	596	56	15,879	37	28
Total	1,067	100	20,799	133	100

On a curb-foot basis almost three times as many overtime parking tickets are given in the metered area as in the non-metered area. It is probable that a greater percentage of cars park overtime where there are no meters than in the metered area, so the relative efficiency of enforcement would be more than is shown in the above table.

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Municipal Highways—Their Planning and Design—Part II

By CAPTAIN H. C. WHITEHURST
Director of Highways, District of Columbia

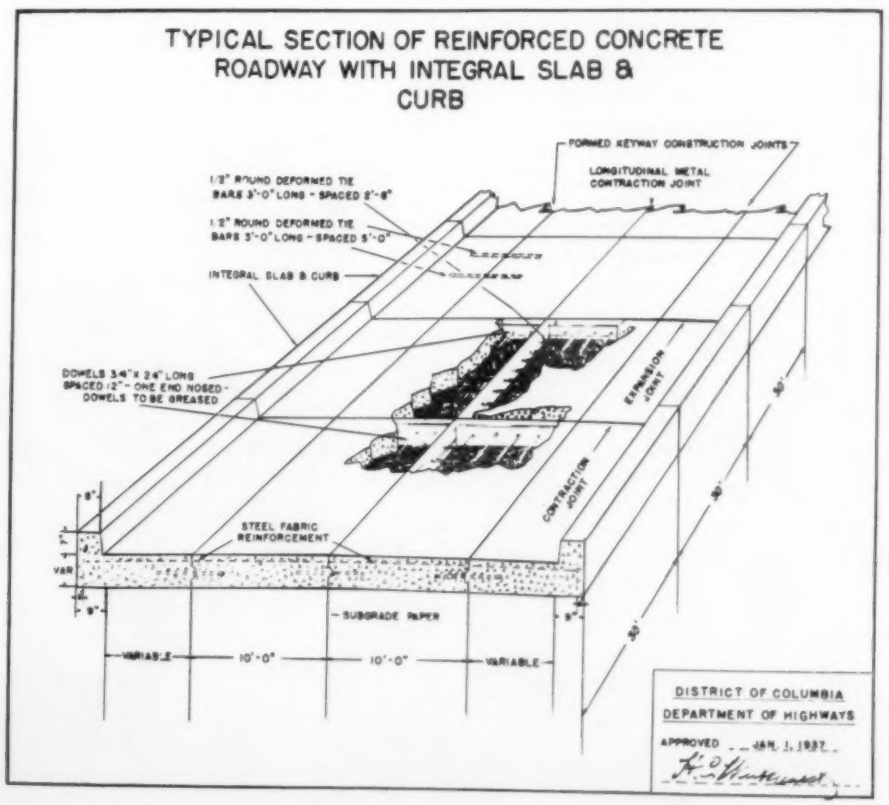
Designing Pavements

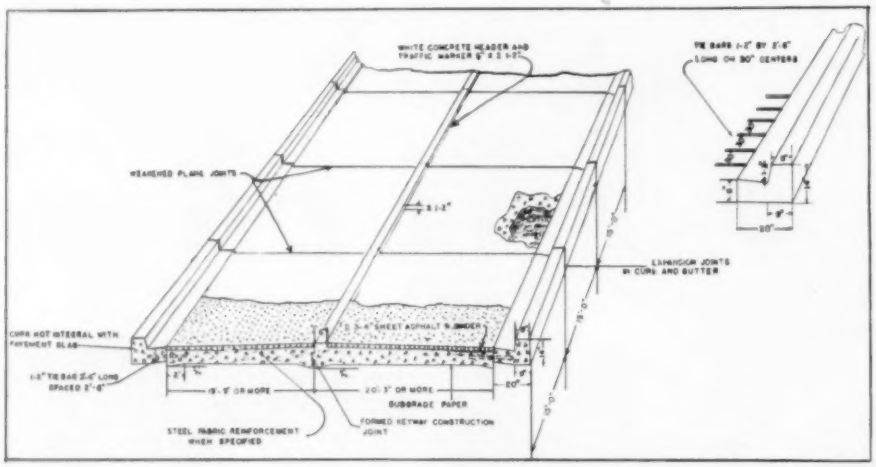
Municipal construction does differ from state construction in that zoning in cities is a general practice, so that the nature of the traffic in cities is quite uniform; property lines are more fixed; and right-of-ways and alignment are altered only in urgent cases. Owing to these more nearly permanent conditions—and the cost as well as inconvenience, particularly to the public, of making replacements—it is believed advisable and economical for cities to consider factors of design and construction methods to a greater degree of refinement, and in even greater detail than for state organizations. A state pavement may well have served its purpose at the end of ten to fifteen years, and rebuilding may be necessary, owing to the change and increase in traffic which could not be anticipated; while a municipal system of highways with its more constant nature of traffic should, if properly designed and constructed, be serviceable to its limit of durability. We do, however, follow the general principles adopted by state highway departments in the design of the cross-section of our pavement slabs.

TYPICAL CONCRETE PAVEMENT, SHOWING ADAPTABILITY OF STANDARD DESIGN TO VARIABLE WIDTH STREETS

For all concrete pavements of less than 40 feet in width, a 20-foot center section with a center longitudinal contraction joint is constructed. Side sections are tied to the center section with ½-inch diameter bars 3 feet in length and

STANDARD DESIGN FOR CONCRETE PAVEMENTS


TYPICAL SECTION OF REINFORCED CONCRETE ROADWAY WITH INTEGRAL SLAB & CURB
FORMED KEYWAY CONSTRUCTION JOINTS
LONGITUDINAL METAL CONTRACTION JOINT
1/2" ROUND DEFORMED TIE BARS 3'-0" LONG - SPACED 2'-6"
1/2" ROUND DEFORMED TIE BARS 3'-0" LONG - SPACED 5'-0"
INTEGRAL SLAB & CURB
DOWELS 3/4" X 24" LONG SPACED 12" - ONE END NOSED - DOWELS TO BE GREASED
EXPANSION JOINT
CONTRACTION JOINT
STEEL FABRIC REINFORCEMENT
SUBGRADE PAPER
VARIABLE
10'-0"
10'-0"
VARIABLE
30'
30'
30'
DISTRICT OF COLUMBIA
DEPARTMENT OF HIGHWAYS
APPROVED JAN. 1, 1927


WHITE CONCRETE HEADER AND TRAFFIC MARKER
TIE BARS
WEAKENED PLANE JOINTS
EXPANSION JOINTS IN CURB AND GUTTER
CURB NOT INTEGRAL WITH PAVEMENT SLAB
TIE BARS
SUBGRADE PAPER
STEEL FABRIC REINFORCEMENT WHEN SPECIFIED
FORMED KEYWAY CONSTRUCTION JOINT

STANDARD DESIGN FOR SHEET ASPHALT PAVEMENTS

spaced 5 feet apart. The curb-and-gutter section is constructed integrally with the pavement slab, a design which provides the increased edge thickness desired, and eliminates construction joints at the curb line.

Construction

Bituminous impregnated paper is used to cover all subgrades before the placing of the concrete. Variation in absorptive characteristics of different types of subgrade soils causes definite variation in the consistency of the concrete. The use of this covering, which is negligible in cost, has proved of value in controlling the consistency of concrete and permits the use of a much drier, and therefore stronger and more durable concrete.

Mesh reinforcing is used throughout all concrete pavement construction, the weights of the reinforcing depending upon the thickness of the slab. Construction around manholes, or similar pavement openings, presents a problem in municipalities not generally encountered in state construction. For example, the appearance of radial cracking around such structures was most prevalent some years ago. From observation it was evident that such cracking was resulting from localized stresses. After a little experimentation, it was found that by effectively distributing the stresses due to shrinkage during the setting of the concrete, cracking could be prevented. To accomplish this purpose, light-weight mesh (chicken wire) is placed about one inch below the surface of the concrete for a section two yards square around these openings. A survey of several hundred such installations made during the past three years has not shown a single failure. The prevention of these cracks often means the elimination of ultimate pavement failure at such locations.

Expansion joints of the air-cushion type or durable filler type utilizing a suitable seal, together with dowel bars or other approved methods for load transfer, are installed at 40-foot intervals when concrete is placed at temperatures of 60 degrees F., or below. When the temperature at the time of construction is above 60 degrees F., expansion joints are placed at intervals of 60 feet, with contraction joints at midpoints, using the same design for transfer of load and sealing at surface as for expansion joints. Expansion joints are ½-inch in width, rather than the usual 1 inch, to effect more efficient load transfer and to improve surface appearance and riding qualities. All concrete road surfaces are finished by lightly drawing a street broom over the surface after final belting. This finish not only has a pleasing appearance, but affords maximum traction and minimizes glare.

We have found the use of an internal vibrator around all forms and joints to be most valuable. It entirely prevents honeycombing. The cost of this practice is small, and contractors are pleased to follow it rather than be concerned with proper spading and tamping.

Many highway departments have experimented with colored concrete in the construction of traffic lanes. The use of carbon emulsion to darken the surface of concrete, particularly when a concrete surface is constructed adjacent to bituminous pavement surfaces, has proved very satisfactory in the District of Columbia. This is most desirable when the lighter-colored cements may be used; it does reduce the glare from such a pavement surface, and the darker color seems to harmonize better in residential sections.

Speeding the Opening of Streets

A factor of first importance in the construction of all roadways, and particularly of municipal pavements, is the necessity for early opening of the pavement to traffic. Test specimens of concrete are made daily on each project and tested by field representatives. As soon as the results indicate that the design strength has been attained, that portion of the project is immediately opened to traffic.

Special study has been carried on to determine the most efficient methods of obtaining early strength concrete. As an intersection is approached, an accelerator is incorporated in the concrete mix for the last day's construction, so that section will be ready to open at the same time as the concrete previously poured. Intersections are constructed with a concrete mix containing either one extra sack of standard portland cement per cubic yard of concrete, or of high early strength cement, as well as incorporating an accelerator. This practice permits the opening of pavements within 24 hours, and in many cases the pavement has been opened to traffic in as short a time as 8 hours, but never until the field tests of specimens from the same concrete have certified that proper strength has been attained. This practice has been found to offer the most practical and economical means of obtaining early strength concrete.

Pavement Bases

It is considered by this Department that all the principles which are used in the design and construction of concrete pavements should be applied to the design and construction of concrete pavement bases.

All concrete bases of 40 feet or more in width are constructed in two sections with a traffic marker dividing the pavement width. The two slabs are joined by a longitudinal formed keyway, in order to prevent displacement of the surface. The curb is constructed separately and is tied to the slab by means of tie-bars.

Owing to the protection against rapid moisture and temperature changes afforded the concrete by the asphalt surface, a unit cement content of 1.25 barrels per cubic yard is used in lieu of 1.60 barrels as used for concrete pavements. This, however, is a higher cement content for pavement base concrete than used in past years by the Engineer Department of the District of Columbia and by many other highway departments. The need for properly designed concrete to insure maximum durability is just as important for concrete bases as for concrete pavements.

The use of mixes with higher unit cement contents does require consideration of the volume changes of concrete. Probably the main reason for the use of lean concrete mixes in the past has been the lack of properly designed expansion and contraction joints. In considering these volume changes, it is possible to plan for and control surface cracks of bituminous pavements.

The specifications of the District of Columbia require weakened plane transverse contraction joints to be placed not more than 15 feet apart in all base slabs. The general practice is to make a groove in the concrete at least 4 inches deep by pressing a layer of building paper into the concrete by means of a metal strip approximately 3/16-inch wide and extending the width of the slab. This groove is of course made prior to the initial set of the concrete. The metal strip is removed after making the groove, while the layer of building paper is allowed to remain in the base slab. Although the concrete is still in a plastic state after removal of the metal strip, the layer of paper prevents the adjacent side of the groove from bonding, and during setting of the concrete provides for the formation of a crack the remainder of the depth of the slab.

Supplementing the formation of planes of weakness to permit of free contraction, expansion joints are placed at the tangent points of intersecting streets and at a maximum interval of 300 feet when construction is carried on at temperatures below 50 degrees F.

A survey of the pavements so constructed in the District of Columbia has shown that where the planes of weakness have been properly installed, the movement of individual sections is so minute that cracking of the asphalt surface is eliminated, except for occasional regular cracks over expansion joints. These expansion joints must be non-extruding and should be placed flush with the surface of the base concrete in such manner as to furnish continuous support to the surface. The surface cracks which may form over the expansion joints are straight and seldom open sufficiently to require maintenance.

ACKNOWLEDGMENT.—From a paper presented at the 1938 Annual Meeting of the Association of State Highway Officials of the North Atlantic States.

Progress in Fire Control

By PERCY BUGBEE
Assistant Managing Director, National Fire Protection Association

PROBABLY the report that received the most discussion at the 42nd annual meeting of the National Fire Protection Association was the one on Municipal Fire Apparatus, which presented a complete revision of former specifications. These new specifications evoked a lively debate and will be worked over by the committee and presented again next year.

The Association officially adopted a model state fireworks law and will act to have it introduced in state legislatures during 1939 sessions. Only partial relief has been secured from local legislation, because of the relative ease with which fireworks stands may be erected just outside city limits.

The Committee on Gases reported regulations for the design and construction of containers for the storage and handling of liquefied petroleum gases.

The Committee on Field Practice secured the adoption of a complete revision of the standards on first-aid fire appliances covering all the common types of fire extinguishers. These standards are widely used as a reference by city building officials and fire department officials and cover the installation, maintenance and use of fire extinguishers in all sorts of occupancies. This committee also brought to date its standards for standpipe and hose systems in buildings. "The N. F. P. A. Regulations on Air Conditioning Systems" are widely used as the basis of local regulations.

A report on the control of water waste from private fire protective equipment contained a discussion on the waste of water in fire-fighting operation, the loss of water under normal operating conditions, and recommendations.

The Committee on Piers and Wharves had adopted a model ordinance regulating the construction and protection of piers and wharves. The Flammable Liquids Committee brought out an ordinance regulating the design, location, equipment and protection of piers and wharves at which flammable liquid cargoes are transferred in bulk. The Marine Section recommended good practice requirements for the location, construction and operation of boat basins and municipal marinas. The rapid increase in the use of motorboats has drawn attention to the prevailing inadequate facilities for the safe and convenient harboring of these boats.

The Farm Fire Protection Committee secured final adoption of new standards for rural fire departments, which will be widely used to measure the effectiveness of the 12,000 volunteer fire departments and will serve them as a guide.

All these reports are available from the National Fire Protection Association, 60 Batterymarch Street, Boston, Mass., and city officials and others interested may obtain copies without charge.

The President Says to Mayor LaGuardia, Regarding Relief

My dear Mr. Mayor:

In reply to your telegram regarding Federal relief program, there is no intention of shifting from present policy of providing relief for able-bodied unemployed through a work program. The states and municipalities must continue to provide for direct relief as their fair share of the total program and cannot expect assistance from the Federal Government in meeting this responsibility. Any confusion regarding the respective responsibilities of Federal, state and local governments which results in a weakening of the efforts of states and municipalities in the field of direct relief or of the Federal work program will prove disastrous and should at all costs be avoided. I will appreciate very much your cooperation in making this clear to mayors.

June 7, 1938 FRANKLIN D. ROOSEVELT.

Water Works in Venezuela

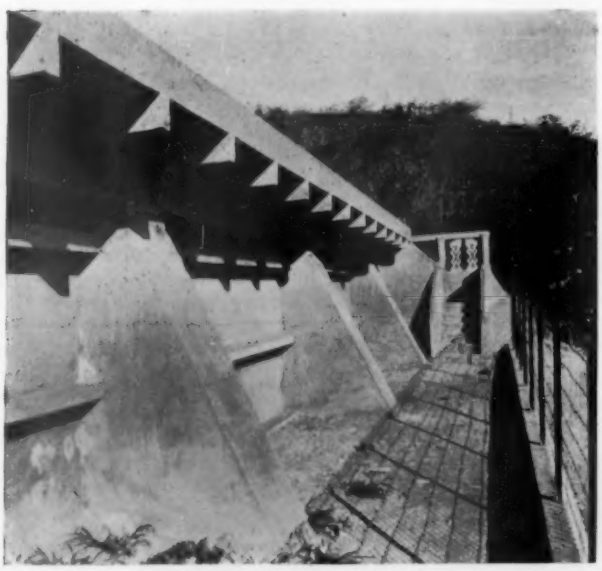
By HARRY CHAPIN PLUMMER

THROUGHOUT the more populous regions of Venezuela, which, like Caracas, are on the llanuras, or mountain plateaus, the surrounding mountains offer perennial sources of water supply which the federal government now is trying to harness and to husband against the dry season while guarding against the physical damage and ofttimes havoc wrought in the other half of the year, when a brook or gully within an hour or two becomes a raging torrent and when even steep-sloped city thoroughfares take on the aspect of natural river courses.

Not only must the utmost skill be exercised in building plans and operations, but the material used in aqueduct and sewer construction must be of the best, the strongest and most durable. A glance at some of the current water-works improvements in Caracas affords an idea of the magnitude of the public works program in its relation to the quarter-million of the city's population. Effective water licenses or services increased by 797 from the 13,897 recorded July 1, 1936, to the 14,694 recorded October 31, 1937.

Following the establishment of the Direccion de Aqueductos, June 20, 1936, a corps of inspectors was put to work checking the water census of the city. Much unnecessary waste was found, due in part to the lack of valves in the majority of the houses, and in part to the open jets of sprinkler systems. The latter condition was corrected by the requirement that small tanks be built with padlocked iron covers.

Reservoirs have been established at strategic locations throughout the city suburbs to afford storage for the water supply. The largest, "El Calvario," has a capacity of 2,509,900 U. S. gallons, from which service is maintained over what is termed the "Middle Network" of the city. "El Polvorin," 1,056,800 gallons, distributes over the "Super-high Network." "El Guarataro," 792,600 gallons, serves the "Lower Network," "El Matadero," 528,400 gallons, supplies the suburban area of "El Paraiso." The three former are fed by "La Toma de Macarao," which, as its name implies, has a fixed annual yield of 66 gallons per second. Distribution is effected by a general pumping system which makes use of three large pumps. These each bear the name of a personage or date in history or one of the poetic appellations so favored by the Venezuelans.



A SECTION OF THE TUMERO AQUEDUCT IN VENEZUELA

Cleaning of the sewage tanks is simplified by the newly laid concrete mains 1.57 inches in diameter and 360 feet in length leading to a deodorizing tank built to receive silt and sediment. The largest of the pumps, the "19 de Abril," reaching a depth of 344.5 feet, has a discharge capacity of 1.59 gallons per second. "Petion's" depth is 196.9 feet, and its discharge is 9.25 gallons per second. One pump serving the Cimenterio del Sur, or Southern Cemetery, reaches to a depth of 223.1 feet, and while its discharge is only 1.59 gallons per second, its water is pumped to a tank having a capacity of 26,420 gallons built upon a mountain slope at an elevation of 82 feet from which distribution is effected by piping to fourteen stations. All these pumps deliver the water by gravity to the sump of the San Martin pumping station, where it is elevated again to the reservoir of Macarao.

Three pumps of the system draw water from the subsoil to the distribution tanks of "El Calvario" by means of turbine pumps. Small pumps of 2½ hp flush the public drains in specified districts of the city.

Work is now proceeding with the installation of the second of two of the "Florida" pumps 460 feet distant from the tanks. These will have a depth of 190.3 feet with a production of 11,889 gallons per hour. From a relay station to be built, piping of 4.92 inches in diameter, mounted upon concrete posts made necessary by the contour of the country, will effect the distribution. A reservoir storage tank without roofing, but protected by walls 8.2 feet high, will have a capacity of 26,420 gallons. In the new fashionable residential suburb of Sabana Grande complete piping and 200 roof tanks with their corresponding iron covers are to be provided for 75 new service units. To insure an unfailing supply, 1,608 feet of 4.33 inches diameter will connect this service with the pumping station "La Florida" for an auxiliary flow which fills a tank of 132,100 gallons capacity.

These major water-works improvements are being carried out not only at Caracas, but in other populous regions of the country. The Ministry of Public Works is now engaged in planning for like operations in areas and communities which hitherto have had only the most primitive water-supply systems and sanitary measures. The equipment and materials for all this construction and extension will come, as in the past, chiefly from the United States.

Status of Municipal Ownership of Water Works in the United States

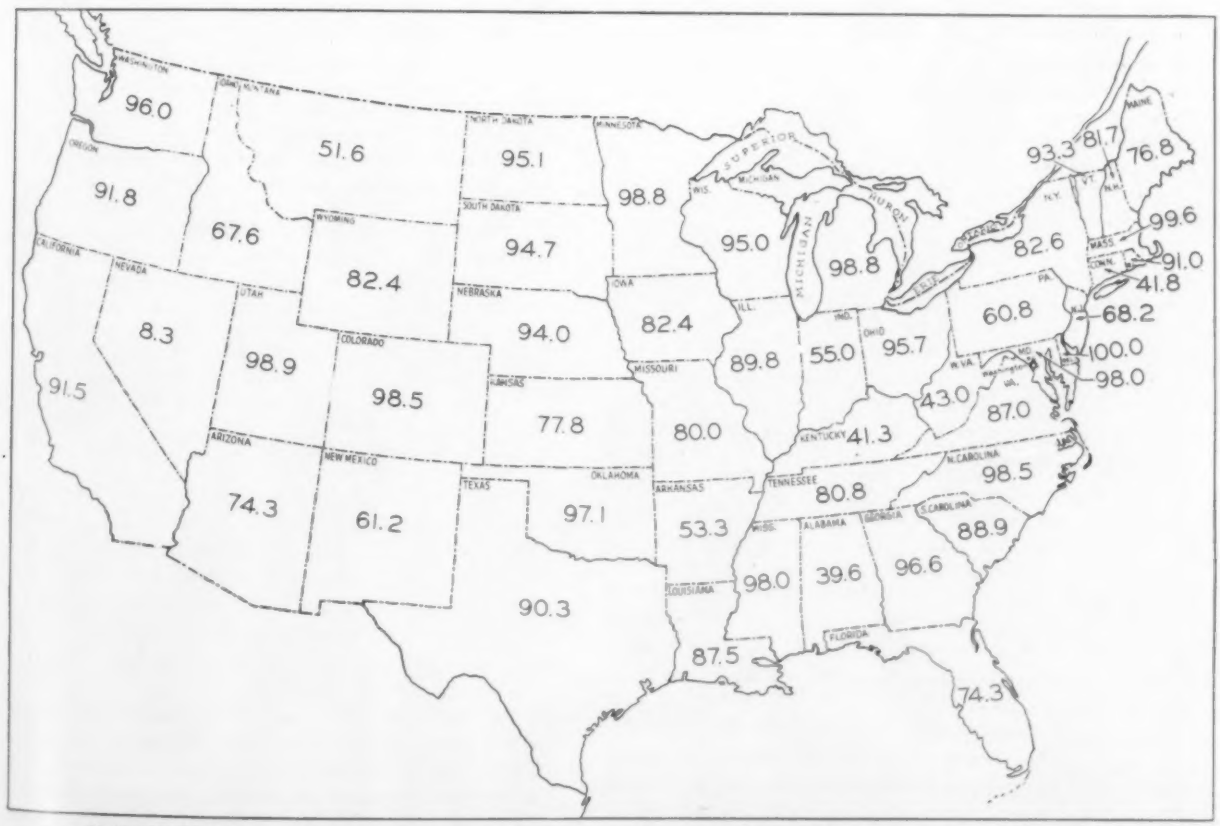
Abstract of the Report by Burns & McDonnell, of Kansas City, Mo.

TO determine the present status of municipal ownership in the water-works field, an ownership survey was made by Burns & McDonnell of all cities in the United States having a population of 3,000 or more. The survey was confined to cities of this size or larger in order to eliminate from consideration the large number of small water properties supplying auto camps and industries, for instance, regarding which it is extremely difficult to obtain reliable information.

This survey of water-property ownership has been summarized by states and a determination made of the population served in each state by municipal and by private properties.

State	Number of Cities		Population Served		
	Municipal	Private	Municipal	Private	Percentage Municipal
Alabama	18	18	323,000	492,000	39.6
Arizona	9	8	120,400	41,900	74.3
Arkansas	18	22	190,100	167,100	53.3
California	99	38	3,727,300	348,100	91.5
Colorado	19	1	508,000	7,800	98.5
Connecticut	27	52	687,900	742,500	48.1
Delaware	5	0	123,200	.....	100.0
Florida	39	12	591,300	204,900	74.3
Georgia	55	6	857,900	29,700	96.6
Idaho	12	4	78,500	37,600	67.6
Illinois	130	37	5,005,500	573,400	89.8
Indiana	60	25	972,900	794,400	55.0
Iowa	63	8	785,200	166,600	82.4
Kansas	50	5	556,300	158,400	77.8
Kentucky *	31	18	631,500	152,600	80.5
Louisiana	37	13	872,700	126,000	87.5
Maine	24	16	317,100	95,600	76.8
Maryland	19	4	969,900	20,600	98.0
Massachusetts *	147	22	3,957,000	150,000	96.3
Michigan	100	6	3,241,800	42,300	98.8
Minnesota	50	3	1,188,100	14,500	98.8
Mississippi	32	1	314,500	6,200	98.0
Missouri	39	24	1,467,900	367,400	80.0
Montana	11	5	91,000	85,700	51.6
Nebraska	21	4	432,300	27,100	94.0
Nevada	1	5	3,200	35,400	8.3
New Hampshire	20	6	241,800	54,800	81.7
New Jersey	25	19	564,000	264,700	68.2
New Mexico	8	7	63,800	40,400	61.2

* Figures given here correct mistakes in the original report.



PERCENTAGE OF POPULATION BY STATES SERVED BY MUNICIPALLY OWNED WATER UTILITIES, JANUARY 1, 1938
Prepared from figures of Burns & McDonnell Engineering Company, Kansas City, Mo.

State	Number of Cities		Population Served		
	Municipal	Private	Municipal	Private	Percentage Municipal
New York	152	76	9,963,900	2,052,500	82.6
North Carolina	56	3	767,700	11,300	98.5
North Dakota	11	1	107,500	5,500	95.1
Ohio	139	19	4,276,100	194,900	95.7
Oklahoma	51	2	729,100	21,400	97.1
Oregon	15	5	432,100	38,100	91.8
Pennsylvania	70	239	3,812,800	2,450,100	60.8
Rhode Island	6	6	587,600	58,000	91.0
South Carolina	29	6	326,100	40,300	88.9
South Dakota	11	1	104,200	5,700	94.7
Tennessee	33	10	716,200	171,600	80.8
Texas	112	31	2,137,000	227,600	90.3
Utah	21	1	280,900	3,100	98.9
Vermont	13	2	116,200	8,300	93.3
Virginia	36	4	668,100	100,600	87.0
Washington	28	4	837,000	35,400	96.0
West Virginia	13	22	206,100	273,900	43.0
Wisconsin	68	5	1,459,000	77,200	95.0
Wyoming	7	2	63,500	13,500	82.4
Totals	2,042	826	56,482,900	11,029,000	....
Percentages	71.2	28.8	.....	.....	83.7

Trend Toward Municipal Ownership in the United States

The first water properties in the United States were developed mainly as private enterprises. Before the turn of the century, however, the number of publicly owned plants had passed the number of plants operated under private ownership. At the present time Burns & McDonnell estimate that there are about 12,500 water properties in the United States, of which 70 to 75 per cent are publicly owned. These 12,500 properties represent a 15 per cent increase over the total number of properties determined by a survey in 1932, but it appears that the major portion of the properties added since that date were small; a good many apparently were auto camps, industrial supplies and other small installations.

Incinerators for Garbage and Refuse Disposal

Discussion of Papers by A. E. Stilson (Published in April)*
and
H. S. Hersey† (Published in February and March, 1938)

In the February-May, 1938, issues of The American City were published the three papers on "Incinerators for Garbage and Refuse Disposal" presented before the Sanitation Group, American Society of Mechanical Engineers. A later meeting was devoted to discussions of the original papers and to the presentation of additional informative short papers, which we are privileged to publish serially in abstract. The three original papers are available as a single reprint from The American City for 25 cents a copy.

Discussion of A. E. Stilson Paper, by H. S. Hersey

MR. STILSON has written very smoothly and logically. We practically agree with him entirely in his combustion discussion and figures. His constant for net Btu value of net combustible per pound, namely, 8,000 Btu, is what we have used in our calculations for years.

In the case of his heat release, he names a figure of "from 15,000 to 22,000 Btu per cubic foot of furnace chamber volume," where we run about 10,000 to 15,000 Btu per cubic foot of *combined furnace chamber and combustion chamber volume*. We look upon it as more logical to consider the heat release as related to the combined volumes because the heat release is never complete in the furnace chamber alone. If we related our heat release to furnace chamber volume alone, we should run about 20,000 to 30,000 Btu per cubic foot, which is more than Stilson's figures above. On this basis, he advocates more conservative figures for heat release than has been our practice. If he really means combined furnace chamber and combustion chamber volume instead of furnace chamber volume alone (as his statement now is), then we would be more conservative than he is.

Perhaps the greatest difference in our methods of calculation comes in the matter of air requirements. We use a short method to arrive at the theoretical air which gives us figures of 7 to 9 pounds per pound of net combustible against Stilson's ultimate analysis method which results in (by his statement) 11 to 13.5 pounds.

Stilson, in further discussion, states that the best results are obtained with about 18 to 20 pounds of air per pound of net combustible. We infer that he would base his calculations for any particular guarantee of temperature on these figures. Our own method would give figures of 14 to 18 pounds of air per pound of net combustible as suitable for a conservative temperature guarantee. Ultimately then, we use about the same basis to make guarantees.

Mr. Stilson does not reveal what he assumes for a figure for losses due to ashes (clinkering), radiation, unconsumed fuel, humidity in air, incomplete combustion, hy-

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† Vice-President and General Manager, C. O. Bartlett & Snow Co., Cleveland, Ohio.

drogen in fuel, and unaccountable. We are accustomed to lump these all together at 20 per cent of the heat in the refuse.

It is quite possible that Stilson would not charge quite so much to this heat loss, but inasmuch as he uses slightly more air in his calculations than we do, which we balance if our 20 per cent loss is more than his, we should probably arrive at about the same calculated temperature figure for any given refuse.

A. E. Stilson Reviews H. S. Hersey's Discussion of His Paper

Mr. Hersey's discussion of my paper brings out many points which are well taken and are subject to clarification.

In industrial work, we estimate the volume of the combined furnace and combustion chamber on a basis of a 15,000 to 22,000 Btu heat release per cubic foot, depending upon whether or not the heat is to be salvaged by boilers. If heat is salvaged, we use the higher heat release value, since the higher Btu release per unit results in a desirably higher temperature.

In industrial work, the rate of charging material and the character of the fuel are reasonably uniform and controlled. This being true, there is safety in using the higher rate. In municipal refuse incineration, we adopt the lower rate of 15,000 Btu for the combined furnace and combustion chamber volume. This is made necessary by the tendency in most plants to overload the destructor and by the unpredictable nature of municipal refuse as regards shape and volume per unit of weight.

Mr. Hersey has consistently built excellent examples of the mutual assistance type of plant. It is my belief, however, that the mutual assistance type of incinerator should have more baffles in the combustion chamber and that the use of secondary air in the combustion chamber is an advantageous provision, if used in connection with the baffling.

It is partially because of the baffling and the secondary air that our furnaces are found to average about 15,000 Btu per cubic foot as compared with 10,000 Btu. Also, in our calculation of total volume we deduct, as non-effective, one foot over the entire grate area as being lost owing to ash accumulation.

It is my belief that Mr. Hersey has a better theoretical background for his figures on air than I have for the figures stated in my paper. Most texts on combustion of wood or waste fuels agree with his figures. In our case, however, we have made and continue to make, as a matter of routine, many tests on flue gases from most of our incinerator installations. Our test figures form the background for the statement in my paper that theoretical air requirements range from 11 to 13.5 pounds per pound of ash-and-moisture-free combustible. It is our belief that there is a great deal more wax paper, paint, oil, animal and vegetable fat, rubber and other high volatiles present in municipal refuse than is commonly realized. It does not require much highly volatile matter to greatly increase the air required.

We assign an arbitrary radiation loss of 5 per cent of the total heat required or available, whichever is higher. To this we add the weight of ash multiplied by 0.19 times the temperature difference and again add the total weight of ash-and-moisture-free combustible, multiplied by 0.24, and finally multiply the total weight of ash plus combustible, by the difference between the atmospheric temperature and the final temperature, to determine our Btu loss. Except in boiler installations or sewage solids incineration, we neglect the heat loss in our figures, since we are not interested in the heat losses to the chimney in ordinary incineration, where all the heat goes up the stack in any case. We point out that water vapor in the atmosphere has already obtained its latent heat, else it would not be vapor nor in the air. Furthermore, the quantity of water vapor entrained in the atmosphere in most cases is not a serious factor from the standpoint of absorbing sensible heat when in the destructor.

Volatiles in Refuse
Discussion by Henry W. Taylor, Consulting Engineer, New York City

Mr. Stilson's discussion brings to mind an important feature in the composition of municipal refuse, the consideration of which has perhaps been slighted. Field analyses for volatiles in sorted garbage and rubbish indicate a large percentage of this type of matter, and this large proportion of the total fuel is such as to warrant a study of it. The following discussion assumes sorting of the refuse and field, proximate analyses of sorted garbage and combustible rubbish.

The total volatiles must of course be divided into two groups—the volatile non-combustible and the volatile combustible. It is convenient to consider "free moisture" as a part of the grand total of volatiles. This matter is driven off in an oven at low temperatures, in the case of the field analysis, and at low temperatures in the actual furnace. However, there is another form of moisture, combined moisture, which is driven off with other volatiles at the higher temperatures. This combined moisture factor must be added to the "free moisture" to obtain a total moisture, or the volatile non-combustibles, accruing from the one element of moisture.

Without an ultimate analysis, the percentage of combined moisture and other minor non-combustibles in the total volatiles set up in the proximate analysis, must be estimated. A study of about 100 fuel analyses with wide variation in characteristics indicates that the volatile non-combustibles, consisting of combined moisture plus small amounts of nitrogen and perhaps sulphur, possibly aggregate in municipal refuse an average of 60 per cent of the total volatile figure in the proximate analysis.

On the other hand, the volatile combustibles consist mainly of volatile carbon and hydrogen, principally in the form of hydro-carbons and some complex and unknown combination of C and H. For practical purposes, and without an ultimate analysis at hand, it is probably safe to assume the available hydrogen at about 2 per cent of the total weight of the fuel, and with this assumption it is then possible to set up a proximate analysis in a new form which gives the required data. An actual determination will serve to illustrate the form and net result of this angle of approach.

MODIFIED PROXIMATE ANALYSIS

Solid non-combustible	27 per cent
Volatile non-combustible	51 per cent
Total carbon	20 per cent
Available hydrogen (assumed)	2 per cent
	100 per cent

In the above, the solid non-combustibles include metals, glass, masonry, cans, etc.; coal ashes in the refuse (determined by sorting, and ignored as to its theoretical heating value); the ash or residue from combustible material. This percentage directly indicates the expected total residue after incineration. The volatile non-combustibles include the free moisture, the combined moisture, nitrogen and sulphur in the fuel. The total carbon is the sum of the fixed carbon after volatile distillation plus 40 per cent of the volatiles determined after the removal of the free moisture minus 2 per cent of total fuel weight. The available hydrogen is estimated. An attempt to determine some constant volatile carbon-hydrogen ratio in a hundred fuels led to the conclusion that variable characteristics of refuse as a fuel made this ratio indeterminate and subject only to some reasonable assumption. The percentage of non-combustibles in the total volatiles of the proximate analysis is also open to a wide range of difference of opinion and to further study and greater accuracy.

However, the above tabulation gives directly the expected residue to be removed from the incinerator plant, and the amount of solid matter whose temperature must be raised to the furnace temperature. It also states the amount of volatile matter which merely serves to rob heat by temperature rise and absorption of latent heat requirements. And it finally states the percentage of material which is available to do the work of supplying the heat robbers with their quota of Btu, and for maintaining suitable temperatures for ignition and combustion of the waste gases escaping from the incinerator.

General Discussion of Papers By Francis C. Holbrook, Department of Sanitation, New York City

The following comments, on the interesting papers prepared by Messrs. Hersey and Stilson on the subject, "Incineration for Garbage and Refuse Disposal," are made with the hope that they will contribute in some measure to the discussions on this subject.

Mr. Hersey has suggested that: "A refractory lining 9 inches thick, backed up by more insulators than usually specified, might be better than 13½ inches of refractories and less insulators." This, of course, is a general statement and I believe it can be amplified to include the proper wall construction to suit the class of material to be burned. For example, where the rubbish content is high, the unit supported air-cooled wall has proved to be adaptable. On the other hand, if the garbage or moisture content runs high, it is better to employ a solid built-up wall of fairly heavy construction to provide a thermal reservoir to minimize the furnace temperature drop that follows charging and clinkering operations. Brick in this area should be a first-quality non-spalling type. An economical choice of insulating refractories or second-quality brick with insulation can be made for flues and breechings following the combustion and furnace chambers. Temperature and gas conditions should be considered before the selection of refractories in any part of the system.

Mr. Stilson states that: "A heat release from 15,000 to 22,000 Btu per cubic foot of furnace chamber volume gives best results in pulp and hogged fuel furnaces. Our own experiments in furnaces we have built indicates that this range is desirable for best incinerator results."

In any type of incinerator that combines furnace and combustion chamber, energy release must be considered to be effected within these spaces. Since the assumed heat release establishes furnace volumes, it may be of interest to compare the wide variations in furnace and combustion chamber volumes of several similarly designed furnaces burning the same kind of refuse and built under separate contracts.

A value of 3,000 Btu per pound of refuse as fired is used for comparison.

Plant	Furnace Volume	Combustion Chamber Volume	Total Volume	Heat Release (3,000 Btu Pound)	Grate Surface Sq. Ft.
A	980	1,908	2,888	8,700 Btu	90
B	1,150	840	1,990	10,000 "	116
C	1,720	1,900	2,620	14,000 "	162
D	1,260	665	1,925	16,000 "	155

These figures show a lack of uniformity in design and the absence of standards that would place these units on a comparable basis. There was less stack dust emission from furnaces having the relatively larger combustion chamber.

The matter of preheater design is one upon which engineers differ. Although refractory preheaters are less efficient than the metallic types, they are as durable and require less maintenance if properly designed and installed. Moreover, they are in no danger of burning out if the forced draft air is cut off. Preheated air temperatures ranging from 225 degrees to 250 degrees are possible with average gas temperatures of 1300 degrees to 1500 degrees.

It is gratifying to note that both Mr. Hersey and Mr. Stilson agree that there is "no mystery in incineration." Apparently, the public works engineer may enter this field with little trepidation and render service on municipal or government projects because of his permanent contact with the job.

The Municipal Administrator as a Planner

AN important development bearing on problems of municipal planning is the effect of the necessary integration of activities, Federal, state and local, on administration. It must of necessity make an administrator more of a planner. The city official has many more relationships to consider now than in the past. In the matter of recreation, housing, health, and sanitation, and particularly all forms of public works, he must consider the part to be played by the state and Federal governments. In instances of which relief and public works are the best-known, direct Federal grants to municipalities make Uncle Sam play an increasingly important role in the municipal government. He brings with him a system of checks and balances of involved contractual, long-time relationships that place the burden on the city to find out where the city is headed. Where the solution of local problems is of national significance, the Federal Government may give financial assistance, but in so doing the National Government usually presupposes or requires a plan in the working-out of the problem.

In suggesting that administrators become plan-minded, I do not mean that administration should swallow planning, or vice versa. I do mean that there must be a better understanding on the part of administration of planning technique and objectives, and, may I say, also on the part of planners of the ways in which plans may be effected.

—From a paper by Earle S. Draper, presented at the National Conference on Planning in Minneapolis, June 20, 1938.

Refuse Collection in 28 Cities in the United States

Prepared from Data Gathered by the Pennsylvania Economy League, Pittsburgh, Pa.

THE accompanying table reporting on the collection of garbage and rubbish in 28 major cities in the United States is published through the courtesy of the Pennsylvania Economy League, Pittsburgh, Pa. In addition, certain other information is appended regarding collection vehicles and collection methods, which is also furnished by the same sources and reported under the names of the individual cities.

Akron, Ohio

A private concern has a contract with the city for the collection of garbage and refuse in one section of the city, which produces approximately 1,500 tons of garbage as compared to 18,434 tons in the remainder of the city. On municipal collection fifteen crews are used normally, each crew consisting of one motor unit and three men. Fourteen trucks are used, the night crew using one of the day trucks for commercial pick-ups.

The supervisory force consists of a superintendent, an assistant superintendent in charge of the office and all records, and a route foreman supervising collection activities. Two mechanics and one utility garage man keep the equipment in repair. A special collection driver, three watchmen and a truck starter complete the personnel. Each collection unit is assigned a definite collection territory, and the truck driver is responsible for the orderly and systematic collection in his territory. The collection equipment for garbage only consists of twelve 1½-ton open-body dump-trucks and two 2-ton open-body dump-trucks.

Baltimore, Md.

Starting January 1, 1938, the city of Baltimore took over the collection of rubbish, which prior to that time had been collected by contract. During the summer season, when three collections per week are made from homes, a load of 4½ to 5 tons of garbage is acquired from an average of 450 homes. During the winter months, when two collections are made per week, collections are made from approximately 850 homes to secure the same load.

Garbage collectors are not permitted to trespass on private property. The Engineer of Street Cleaning designates a point just inside the rear gates of each property from which rear collections will be made. When no rear collection point is available, garbage must be placed at the curb. About 35 per cent of the total collections are made at the curb.

Baltimore has 46 2½-ton trucks equipped with hydraulic hoists and dual rear-wheel construction. The bodies are 10½ feet long, 37 inches wide inside, and 37 inches wide at the rear. They are 28 inches high and have a water-level capacity of 4.63 cubic yards. The solid metal cover of 16-gage steel is semi-circular, with four curtain-type doors consisting of interlocking corrugated galvanized steel sections with malleable iron end locks and wear plates which, when raised, roll around curtain rollers and run in channel tracks. The tailgate is hinged at the top and equipped with rubber gaskets and a manual lock, and is made watertight. In the upper center of the tailgate is a hinged door 30 x 26 inches for loading at the rear of the truck when necessary. The loading height does not exceed 60 inches. The center of the floor of the body is raised to give room for hoist longitudinal structural members and cross members when they pass over the chassis frame. The trucks are equipped with an hydraulic type hoist arranged for rear dumping of the body to an angle of 55 degrees.

Buffalo, N. Y.

The city of Buffalo owns 41 1½-ton tractors with semi-trailers attached, each having a capacity of 25 cubic yards; 15 5-ton ash trucks with a capacity of 9 cubic yards; 10 3½-ton ash trucks with a capacity of 7 cubic yards; 40 ash wagons with a capacity of 5 cubic yards; and 15 refuse wagons with a capacity of 25 cubic yards.

Chicago, Ill.

Chicago has 50 wards, each in charge of a ward superintendent and with an office and yard maintained in each ward. These fifty wards are divided into five divisions, each division being in charge of a division superintendent of streets. Garbage and ash collection routes are laid out and all cleaning activities are conducted from the ward offices.

The city owns 87 tractors, 508 side-dump trailers of 6 cubic yards capacity, and 128 dump-trucks of 7 cubic yards capacity. A trailer unit consists of six trailers and one tractor. Three trailers, horse-drawn through the alleys, are loaded while three full trailers are being hauled by one tractor to the dump.

Cincinnati, Ohio

Each collection crew in Cincinnati consists of six employees, not including the driver. Each crew loads for two trucks. Two of the employees go along ahead of the truck and bring the refuse cans to the curb. Three of the employees accompany the truck and load, while the sixth member of the crew returns the empty cans to the rear of

the houses. The collection equipment in Cincinnati includes 2 10-cubic-yard trucks, 35 8-cubic-yard trucks, 11 6-cubic-yard trucks, 3 8-cubic-yard semi-trailers, and 18 6-cubic-yard semi-trailers.

Flint, Mich.

There are six districts in Flint, which, during the summer, are divided into 33 collection routes, and during the winter into 42 collection routes. The collection equipment for garbage consists of 12 1½-ton 4-cubic-yard dump-trucks used from June 1 to October 19, and 8 1½-ton 4-cubic-yard dump-trucks for the remainder of the year. For rubbish 7 1½-ton 4-cubic-yard dump-trucks are used.

Fort Worth, Texas

Fort Worth uses 30 1½-ton 6-cubic-yard trucks for the collection of refuse.

GARBAGE AND RUBBISH COLLECTION

	Population 1930 Census	Area Sq. Mi.	Joint or Separate Collection of Garbage and Rubbish	Collection Trucks Deliver to Place of Disposal or Stations	No. of Crew On each Truck Including Driver	Residential Collection	Business Collection
1. Akron	255,040	54.06	Separate *a*	Place of disposal	3	Weekly	6 per wk.
2. Baltimore	804,874	91.93	Separate	Place of disposal	4	S—3 per wk. W—2 per wk.	Nightly
3. Boston	781,188	43.90	Separate	Loading station *c*	*	S—2 per wk. W—Weekly *d*	*
4. Buffalo	573,076	42	Joint	Place of disposal	3	R—Weekly AH—2 per wk.	6 per wk.
5. Chicago	3,376,438	201.9	Joint *e*	Place of disposal *f*	T—4 WA—2	Weekly	*
6. Cincinnati	451,160	71.41	Joint	Place of disposal	6 *g*	S—2 per wk. W—Weekly	*
7. Dayton	200,982	23.69	Separate	Place of disposal	2–3	R—Monthly AH—Weekly	Weekly
8. Detroit	1,568,662	137.9	Separate	Place of disposal	T—2-3 WA— 1	Varies	Varies
9. Flint	156,492	29.85	Separate	Loading station	Gar.—2 Rub.—1	S—2 per wk. W—Weekly AH—Daily *h*	Daily *h*
10. Hartford	164,072	17.5	Separate *i*	Place of disposal	4	2 per wk. *d*	Daily
11. Fort Worth	163,447	46	Joint	Place of disposal	2	2 per wk.	Daily
12. Grand Rapids	168,592	23.02	Separate *a*	Loading station	T—2-3 WA— 2	S—1 per 4½ da. W—Weekly	Daily
13. Los Angeles	1,238,048	450.63	Separate	Loading station *a*	2	R—2 per wk. AH—3 per wk.	Nightly
14. Memphis	253,143	48.54	Separate	Place of disposal	T—3 WA—1	R—2 per wk. AH—3 per wk.	6 per wk.
15. Milwaukee	578,249	44.1	Separate	Loading station	2	Weekly *j*	*
16. Minneapolis	464,356	58.79	Joint	Place of disposal—40% Loading stations—60%	3	Weekly	No city collection
17. Newark	442,337	23.6	Joint	Place of disposal	2–3	R—2 per wk. AH—3 per wk.	3 per wk.
18. New Haven	162,655	15.157	Separate *a*	Place of disposal	2	R—2 per wk. AH—Daily	Daily
19. Oakland	284,063	60.25	Joint	Loading station	3	R—Weekly AH—As required	Daily
20. Omaha	214,006	36	Separate	Place of disposal	2	R—2 per wk. AH—Daily	Daily
21. Philadelphia	1,950,961	129.7	Separate	Place of disposal—60% Loading stations—40%	1–3	S—3 per wk. W—2 per wk. *d*	S—3 per wk. W—2 per wk. *d*
22. Portland, Ore.	301,815	66	Joint	Place of disposal	1–2	R—1–2 per wk. AH—3–6 per wk.	3–6 per wk.
23. Richmond	182,929	24	Separate	Place of disposal	5 *k*	S—2 per wk. W—Weekly *d*	S—2 per wk. W—1 per wk. *d*
24. San Diego	147,995	22	Separate	Gar.—Loading station Rub.—Place of disposal	3	2 per wk.	Daily
25. St. Louis	821,960	61.3	Separate	Place of disposal	2–3	3 per wk.	Daily
26. Toledo	290,718	32.97	Separate *a*	Place of disposal	2	R—Weekly AH—2 per wk.	2 per wk.
27. Worcester	195,311	39	Separate *a*	Place of disposal	5	2 per wk.	2 per wk.
28. Youngstown	170,002	33.66	Separate *a*	Place of disposal	*	R—Weekly AH—Daily	Daily

* Insufficient information available.
a Garbage only.
b See list for size of collection trucks when using these figures.
c Part of rubbish and ashes is taken to place of disposal.
d Rubbish—weekly. (Boston varies from 7 to 11 days.)
e Ashes included.
f Two railroad stations are operated for remote districts.
g Does not include driver. Two crews for three trucks.
h Rubbish collected each 5-7 weeks.
i Ashes and rubbish collected together.
j Rubbish collected monthly.
k Five men to two trucks.

Hartford, Conn.

There is no uniformity in garbage collection in Hartford. About seventy licensed farmers collect garbage with their own trucks, which must be watertight and covered.

Memphis, Tenn.

The city of Memphis uses 42 1½-ton trucks and 27 1-mule carts for the collection of refuse.

DATA FROM 28 UNITED STATES CITIES

Place of Pickup	Average Length of Haul-Miles	Avge. Loading Time *b* Required		Avge. No. of Houses *b* Per Load	
		Residential	Business	Residential	Bus.
Backdoor	11.2	3 1/12 hrs.	3⅜ hrs.	292	72
Alley—65% Curb—35%	12	*	*	S—450 W—850	*
Varies	*	1¼ hrs.	*	75	*
Alley or Curb	6	R—2 hrs. AH—¾ hrs.	¾ hrs.	R—75 AH 3–4	3–4
Alley or Curb	3	2/3-5/6 hrs.	*	20–24	*
Backdoor	2½–3	*	*	*	*
Alley or Curb	¾	R—1¼ hr. AH—1 hr.	1 hr.	R—20 AH— 1	1
Alley or Curb	Varies	Varies	Varies	Varies	Varies
Backdoor	12	Varies	Varies	350	*
Backdoor	1.5	R—14/15 hr. AH—7/10 hr.	5/6 hr.	R—50 AH—10	55
Alley—45% Curb—40% Backdoor—15%	2	¾ hr.	½ hr.	R—60 AH—40	40
Alley or Backdoor	*	Varies	Varies	*	*
Alley or Curb	6.6	*	*	*	*
Alley or Curb	3.12	1½ hrs.	¾ hr.	200	310
Backdoor	4.84	2 hrs.	*	*	*
Alley—65% House—35%	*	2⅔-1 3/5 hrs.	No city collection	*	No city collection
Backdoor	4.1	R—1 1/6 hrs. AH—11/12 hr.	11/12 hr.	R—60 AH—38	30
Backdoor	1.5	R—2 hrs.	*	*	*
Backdoor	6	*	*	*	*
Alley and Backdoor	16	3 hrs.	2½ hrs.	R—200 AH—125	5–7
Alley, Curb and Backdoor	3	*	*	*	*
Backdoor	10	*	*	*	*
Alley or Curb	3	*	*	*	*
Alley, Curb and Backdoor	4	Gar.—3 hrs. Rub.—2 hrs.	*	*	*
Alley and Curb	3.2	*	*	*	*
Alley and Backdoor	*	2 hrs.	2 hrs.	*	*
Backdoor	2	R—4 hrs. AH—2½ hrs.	2½ hrs.	R—600 AH—400	350
Backdoor	*	*	*	*	*

ABBREVIATIONS
AH—Apartments and hotels.
R—Residential houses.
S—Summer.
W—Winter.
T—Trucks.
WA—Wagons.

Milwaukee, Wis.

The trailer-train method of collection is used, consisting of four loading units to each hauling unit. Each loading crew, consisting of one team and driver and one helper, loads four 4½-cubic-yard side-dump trailers daily. Milwaukee has a Bureau of Municipal Equipment, which has control of all equipment. Thus the interdepartmental use of equipment prevents an itemization of equipment used for refuse collection.

Minneapolis, Minn.

The equipment used for refuse collection in Minneapolis consists of 29 1½-ton trucks, 3 5-ton truck tractors with 10 semi-trailers, 15 10-12-cubic-yard enclosed dump-trucks, 1 service truck, and 200 steel garbage tanks of 100-cubic-foot capacity which are demountable from the truck platform.

Newark, N. J.

The city of Newark uses 50 to 16-2/3-cubic-yard trucks and 3 5-cubic-yard dump-wagons for the collection of municipal refuse.

Philadelphia, Pa.

In Philadelphia the refuse collection equipment includes: 80 6-cubic-yard horse-drawn rubbish wagons; 30 12-cubic-yard horse-drawn rubbish wagons; 5 16-cubic-yard 5-ton rubbish trucks; 90 3.5-cubic-yard horse-drawn garbage wagons; 8 6-cubic-yard 3-ton garbage trucks; 2 1-cubic-yard 5-ton garbage trucks; 1 8-cubic-yard Collecto truck on trial; 140 4-cubic-yard horse-drawn ash wagons; and 45 8-cubic-yard 3-ton ash trucks.

Richmond, Va.

The city of Richmond uses 13 1½-ton garbage trucks and 32 1½-ton ash and rubbish trucks for the collection of refuse.

San Francisco, Calif.

San Francisco offers an excellent example of private collection closely regulated by the City and County. The City and County of San Francisco licenses all private collectors, establishes districts for each, determines the price rates to be charged, and maintains a comprehensive control and regulation. The private collectors directly bill the householders for the services rendered.

San Diego, Calif.

About one-half of the garbage is collected by the city and delivered to a central hopper, where it is furnished to hog producers free or at prices ranging to 80 cents per ton. The rest of the garbage is collected by private individuals who wish to use it for hog feed. The garbage collection equipment owned by the city consists of 8 3¾-cubic-yard or 2½-ton fish-tail trucks. The rubbish equipment which serves the entire city consists of 15 14-cubic-yard 2½-ton trucks.

St. Louis, Mo.

In St. Louis the garbage is ground (see THE AMERICAN CITY, June, 1938, pages 43 to 46) and then either sold or deposited in the sewers. The ground garbage which is sold sells for $1 per ton. Licensed private collectors who collect for their own use pay $200 per truck per year as a license fee. The revenue from these two items totals approximately $50,000 per year.

The garbage collection equipment owned by the city of St. Louis includes 15 8-cubic-yard fully enclosed collection trucks and 30 6-cubic-yard fully enclosed collection trucks. (About the time this information was submitted, about half of the city's garbage was collected by private collectors; since then the city has taken over all collections.)

Toledo, Ohio

The city of Toledo owns the following equipment for the collection of garbage: 8 6-cubic-yard Elgin Garbage Getters; 5 8-cubic-yard Elgin Garbage Getters; 8 8-cubic-yard 5th wheel trailers, which are hand-dumped and side-tipped; and 2 5-cubic-yard open dump-trucks.

Legal Provisions Regulating the Use of State Motor-Vehicle Funds for Local Roads and Streets[1]

GASOLINE TAXES

State	Tax Rate *Cents*	Distribution to Local Roads and City Streets
Alabama	6	3 cents to counties, distributed equally.
Arizona	5	3/10 to counties, according to gasoline sales in each.
Arkansas	6.5	7.7 per cent to counties, on basis of population, registration, and area.
California	3	½ to counties; $5,000 for each county and county-city, 4 times per year; balance distributed according to registrations.
Colorado	4	27 per cent to counties, 3 per cent for extensions of state system in cities, towns, and counties; on basis of state mileage in counties.
Connecticut	3	
Delaware	4	
Florida	7	3 cents to counties, distributed among them by particular statutes.
Georgia	6	1 cent to counties on basis of state-aid mileage in each.
Idaho	5	
Illinois	5	½ to counties, ½ to municipalities, on basis of vehicles registered.
Indiana	4	40 per cent to counties, 10 per cent to cities; according to population.
Iowa	3	4/9 to counties, by area.
Kansas	3	
Kentucky	5	
Louisiana	5	
Maine	4	To general highway fund, with registration fees, from which $150,000 goes to town roads, $700,000 to third class roads, on mileage basis, and $1,000,000 to state-aid roads according to town valuation.
Maryland	4	1.05 cents to counties, by mileage of county roads; 1.15 cents to Baltimore city.
Massachusetts	3	
Michigan	3	To state highway fund, with registration fees, from which $6,000,000 goes to counties, ⅞ in proportion to fees collected, ⅛ equally.
Minnesota	3	½ to counties, based on mileage and traffic needs.
Mississippi	6	2½ cents to counties, on basis of population, registrations, and area.
Missouri	2	
Montana	5	
Nebraska	4	½ to counties.
Nevada	4	
New Hampshire	4	Small amount to some local roads (less than 9 per cent of total in 1936).
New Jersey	3	$5,000,000 to city streets.
New Mexico	5	
New York	3	5 per cent to New York City; 20 per cent to counties, by mileage.
North Carolina	6	
North Dakota	3	½ to counties on basis of registration fees collected.
Ohio	4	3 cents, minus about $285,000, to counties, villages, and townships on basis of vehicles registered.
Oklahoma	4	¼ to counties, according to population and area.
Oregon	5	
Pennsylvania	4	½ cent to counties, based on gas-tax returns during preceding 3 years.
Rhode Island	2	
South Carolina	6	1 cent to counties, based on registrations.
South Dakota	4	
Tennessee	7	To counties: 1 cent equally, ½ cent by population, and ½ cent by area.
Texas	4	
Utah	4	
Vermont	4	$500,000 to local roads, by mileage.
Virginia	5	$239,000 in 1936 for the 3 counties not under state control.
Washington	5	3 cents to counties and cities, according to gas sales.
West Virginia	4	
Wisconsin	4	
Wyoming	4	25 per cent to counties; based 30 per cent on area, 30 per cent on rural population, and 40 per cent on assessed valuation.

[1] Data incomplete.

REGISTRATION FEES

State	Distribution to Local Roads and City Streets
Alabama	20 per cent to incorporated municipality or county where owner resides.
Arizona	50 cents of original fee retained by county.
Arkansas	
California	Approximately 30 per cent to counties in proportion to registrations.
Colorado	50 per cent to counties in proportion to collections.
Connecticut	
Delaware	
Florida	
Georgia	
Idaho	90 per cent retained by counties.
Illinois	
Indiana	¼ to counties and cities; counties, ⅞ on mileage, ⅛ on population; cities, on basis of population.
Iowa	
Kansas	10 cents of each registration to county.
Kentucky	
Louisiana	
Maine	
Maryland	After debt service and operating expenses of motor-vehicle department, traffic court, etc., 30 per cent to Baltimore.
Massachusetts	
Michigan	See gas-tax data.
Minnesota	
Mississippi	All to counties where collected.
Missouri	
Montana	All to counties where collected.
Nebraska	5 cents retained by counties for each original registration.
Nevada	
New Hampshire	Small sum for state-aid ($272,000 in 1936).
New Jersey	Carrier taxes to municipalities.
New Mexico	15 per cent to counties in proportion to registrations.
New York	25 per cent to counties.
North Carolina	
North Dakota	
Ohio	47 per cent to counties where car registered.
Oklahoma	9 per cent to cities, 51 per cent to counties.
Oregon	
Pennsylvania	
Rhode Island	
South Carolina	
South Dakota	76½ per cent to counties where collected.
Tennessee	
Texas	100 per cent to county where collected, up to $50,000; 50 per cent up to $175,000.
Utah	
Vermont	
Virginia	
Washington	
West Virginia	
Wisconsin	20 per cent retained by town, village, and city; also $3,000,000 to counties for state-aid roads, 40 per cent on basis of registrations and 60 per cent by mileage.
Wyoming	County registration fees retained.

—From the Report of the Department of Highway Finance, Highway Research Board, presented by Thos. H. MacDonald, Chief, U. S. Bureau of Public Roads, Chairman.

Bituminous Macadam for Municipal Pavements

Examples to Show Its Adaptability to Municipal Pavement Salvage Operations

By RALEIGH W. GAMBLE
Superintendent, Bureau of Street Construction and Repairs, Milwaukee, Wis.

IN THE growth of a city the engineer is confronted constantly with the problem of the obsolescence and inadequacy of public improvements, the solution of which frequently presents the alternative of rehabilitating the present structure or an entire reconstruction; the final decision being made after balancing the saving in cost against the service value of the reconstructed structure as compared with an entirely new one. In this article I will discuss a macadam pavement rehabilitation program and two applications of stage construction in which the ultimate construction will salvage the entire original investment.

The details of design and construction will be omitted, since they are standard procedure and unimportant in this discussion. This article is intended to illustrate successful applications of the principle of salvaging existing pavements economically.

Waterbound Macadam Resurfacing

Milwaukee emerged from the horse-and-buggy era with 200 miles of characteristically high-crowned waterbound macadam pavements flanked by cut-stone curbing. Many of these curbs had settled or frost-heaved out of position. The chuck-holes in the pavements, and dust nuisance, made immediate relief imperative, but the cost of repaving this large yardage could not be financed except over a long term of years.

The first improvement of these streets consisted in building a mat coat with hot applications of asphalt or tar covered with torpedo sand. This treatment eliminated the dust and also the chuck-holes except on individual streets where the traffic broke through the surface, especially during early spring thaws. In order to keep the surface intact, surface treating must be repeated at about three-year intervals. This requires a hot application of 0.33-gallon tar or an asphalt oil covered with 15 pounds of torpedo sand at a cost of 10 cents per yard.

As traffic increased, it was found that vehicles used only the center of the street, because of the excessive crowns and deep gutters, thus reducing the carrying capacity of the roadway. All subsequent improvements have provided for crown reduction. This was accomplished either by lowering the center of the roadway or raising the gutters. The depth of road metal as indicated by test holes showed such a wide variation that scarifying and removing a portion of the crown was not advisable as standard practice. In some cases the thickness of material was less than the desired crown reduction.

Since the curb face was generally much higher than necessary and much of the curb needed resetting, necessitating tearing up the pavement in front of it, it was decided to reshape the pavements by filling in the gutters and then resurfacing the entire width of roadway. Tar penetration macadam was chosen as the type of pavement best suited to this work. Further consideration led to the decision that the work could be handled by force account more economically than by contract, since a fair unit for bidding purposes was difficult to establish. The thickness of pavement varied too much to use a square yard as the unit, and the control of the work would be difficult if a contract was let on a basis of gallons of tar, tons of stone, etc., in place, especially since standard cross-sections could not be maintained. The shape of the pavement must necessarily deviate from a standard section in order to meet local conditions on each street. Under these conditions it would be difficult to hold the contractor to the use of a minimum amount of material. It seems to be human nature for a workman to correct an irregular surface by adding material to the depressions rather than by removing the high spots, regardless of the type of pavement being laid.

This method of treatment of waterbound macadam streets has been followed since its inception in 1912. All the streets have had mat coats, and most of them the tar penetration resurfacing either from the gutter to the quarter points or entirely across the roadway.

Single Course Resurfacing

Variations of the basic design have been resorted to in order to meet existing conditions. In cases where the curb face is sufficient and the desired crown reduction moderate, a single course resurfacing may be built with a thickness of 2½ or 3 inches in the center of the street and increasing to 5 inches at the gutters. On the higher-crowned pavements, it is often necessary to raise the curbs as high as possible, allowing only a minimum slope from walk to curb, and then build up the gutters prior to the resurfacing of the entire roadway. Many of the pavements are fairly flat from the center to the quarter points and have a sharp fall from there to the gutter. If the original mat coat is in good condition, a wedge of bituminous macadam is built from gutter to quarter point. The construction of this wedge requires care in the application of the tar. It is applied with the hand spray so that the application can be

reduced as the wedge feathers out, thereby eliminating the fat streak at the joint that resulted when the bitumen was applied through the spray bar of the distributor. A uniform appearance is obtained by applying a seal coat over the entire roadway.

The maintenance cost of the bituminous macadam is lower than that of the mat coat, both in the reduced yardage of repairs required and in seal coating, as it is sealed at five- to eight-year intervals.

This method of salvaging the macadam pavements has been well received by the public. The abutting property owners appreciate the saving in cost to them, and the motoring public finds the streets easier to drive upon. It has also improved parking conditions. It was impossible to open the doors of the modern low-hung, wide-door cars without their striking the ground on the higher crowned pavements, and there was also trouble in pulling away from the curb in winter weather.

Method of Assessing Costs

In order to legalize the assessments for this work when not done by formal contract, a bill was passed by the State Legislature providing for the assessment of costs to the abutting property. The assessment of costs rather than an assessment of benefits and damages for the improvement, as is our practice for all other assessable public improvements, simplified the procedure. Action of the Common Council authorizes the work, and the assessment is not made until after it is completed. After a few years' operation, the statute was amended to include some of the provisions of the general special assessment law which reduced the assessment against the abutting property. The amended law provides that the cost of the paving of street and alley intersections and one-half of the cost of the paving abutting the long side of corner lots be borne by the city. The cost to the abutting property varies from about one-third to two-thirds of the cost of a new concrete pavement, depending on the amount of curbing reset and the depth of pavement required in the gutters.

Drive Built Over an Ash Dump

The construction of a bituminous macadam pavement over an ash dump is an illustration of an economic design of a pavement on a fill which it is known in advance is unstable.

After nearly twenty years of effort the city secured the riparian rights to the shore of Lake Michigan from the downtown area northward. Very little dry land was included in these dedications; so for several years the lake front was used as an ash and rubbish dump, and a strip of land several hundred feet wide was built out into the lake. This area has been developed into a park, and passing through it a 56-foot drive, three miles in length, has been built. There are few entrances to this drive from the west and no intersecting streets, which makes it an ideal by-pass from the business section to the northeast residence area and the north shore suburbs.

In choosing the type of pavement to be used for the drive, it was realized that there would be some subsurface settlement due to the variety of materials used for filling. A flexible type of pavement was indicated, and it was desirable to use a type of construction that could be brought back to section cheaply as it settled out of shape.

Bituminous macadam was adopted as suitable to satisfy these conditions. It was also planned that after complete subsidence the macadam pavement could be used as a base for a high-class surface. Thus the investment in the temporary pavement would not be lost in the ultimate construction. The first section of the drive was opened in 1928 and the job was completed in 1929. The drive has been used with little maintenance except bringing up low areas in order to re-establish drainage.

On January 1, 1937, the title to all city parks was transferred to the county, an action which relieved the city of jurisdiction over this drive. The county has plans under way for the resurfacing of the drive during the coming summer, which will complete the construction as originally planned.

Relief Program Construction

Fifteen years ago Milwaukee was one of the most densely populated large cities in the United States, with a density of 18,300 persons per square mile. In order to alleviate congestion, a department was created which waged an active campaign of annexation. Several of the suburbs followed suit, and for ten years the battle raged in no-man's-land, the unincorporated area between the city limits and the suburban boundaries.

Several of the areas annexed in the late twenties were built up but had few or no public improvements. The grading and paving of streets in these areas has been prosecuted with relief labor since 1933. Under normal conditions, the cost of the paving would be assessed against the abutting property, most of which is now delinquent. It was desirable to get these people out of the mud with the least public expense and without a complete breakdown of the special assessment system.

The plan adopted provided for stage construction: the first step to be done by relief forces and financed without special assessment to the abutting property; the subsequent steps to be completed at a later date by contract, and the usual assessment of benefits to be made.

The relief portion of the work consisted in grading the entire street, the subgrade of the roadway portion being graded 8 inches below established grade to provide an ultimate 8-inch pavement. Pathways of stone screenings were laid in the walk area, and the roadway was paved with a 5-inch bituminous macadam pavement. This pavement is essentially the base course of our usual 8-inch macadam construction except that it is finished off and sealed in order to provide a tight surface. Some settlement has occurred over heavy fills, and many utility cuts are anticipated, since the enforcement of the ordinance requiring the installation of all underground work before paving was waived on these streets. Eventually it will be desirable to cover these temporary pavements with a 3-inch bituminous macadam surfacing, at which time the roadways will be curbed and concrete walks built; the cost to be assessed against the abutting property as usual.

Many other examples of pavement salvage, both with bituminous macadam and with other materials, could be enumerated which would only further illustrate the idea.

ACKNOWLEDGMENT.—Prepared from a paper presented at the 1938 Convention of the American Road Builders' Association, Cleveland, Ohio.

Average Annual Repairs $500 on Diesels 12, 15, and 17 Years Old

By H. L. LINGO

Superintendent, Water and Light Department,
Horton, Kans.

ONE OF the most interesting and significant items in each annual report of the Horton diesel-electric plant is the figure for engine repairs, which averaged less than $500 per year, as indicated in the last line of the table below:

Our youngest diesel generator is 12 years, the next 15 years, and the third is 17 years old. The last two to be installed are 500-kw vertical single-acting 4-cycle air-injection diesel engines built by Worthington Pump and Machinery Corporation, and they and the original 275-kw McIntosh & Seymour unit are operating side by side, as shown in the accompanying photograph. The middle unit, built by Worthington in 1922, made a record in 1923, which was 15 years ago, when it ran without shutdown for 201 days.

Our operating figures have been quite constant during the last five years, as the table shows. The number of kilowatt-hours produced per gallon of fuel oil was exactly the same in 1937 as in 1934.

The following table presents six significant figures indicating operating efficiency during the last five years:

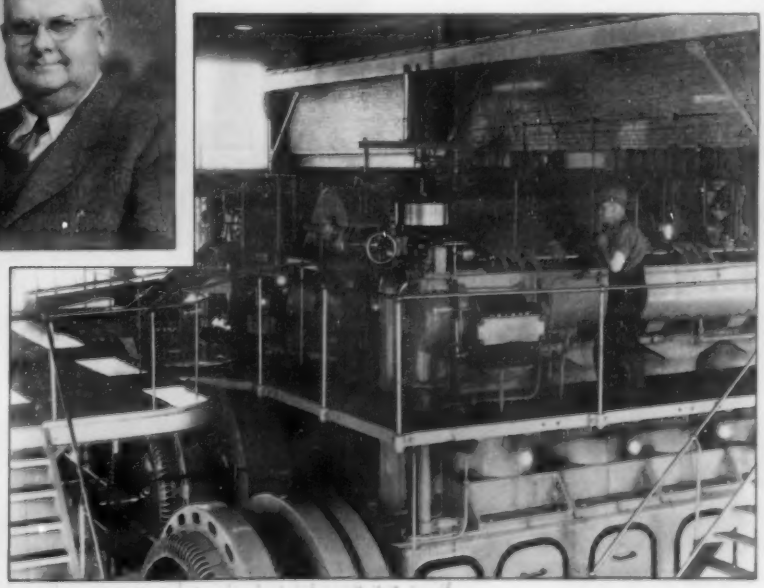
	1933	1934	1935	1936	1937
Kwh produced, in 1000's	1,554	1,774	1,666	1,886	1,874
Kwh per gallon fuel	9.66	10.1	9.22	9.84	10.1
Kwh per gallon lubricating oil	1,609	1,461	1,568	1,430	1,187
Cost fuel oil	$5,487	$6,918	$6,092	$8,740	$9,277
Cost lubricating oil	492	712	664	678	524
Cost engine repairs	1,610	None	156	235	411

Ten years ago the property was valued at $216,246, with $235,500 bonds outstanding. No other prime movers have been added, but for 1937 the property was valued at $265,774, with only $47,500 in bonds outstanding. Cost of production during this 10-year period was quite constant at $0.0091, and the average price received per kwh was 5.47 cents in 1928 and 3.65 cents last year, a third reduction. The annual income for the last six years has been very even, averaging $47,000 and amounting to $48,891 in 1937. Considerably increased load is expected through rural electrification, which started in the latter part of 1937.

The rates are 5 cents per kwh for the first 100 kwh; 4 cents for the next 300 kwh; 3 cents per kwh for over 400; minimum monthly bill, $1.25; 3 cents per kwh for heating; 3 cents for over 200 kwh for power.

An outline of the rate history is given below:

	AVERAGE CHARGE IN CENTS PER KWH FOR—			
	25	100	250	500
1935-38	5.00	5.00	3.20	3.00
1931	6.00	5.50	4.00	....
1929	8.00	7.00	6.00	5.00
1928	9.00	8.50	6.80	5.90
1923	10.60	8.90	7.56	6.78
1922	12.60	10.90	9.56	8.78
1920	14.60	12.90	11.56	10.78
1917	12.80	11.70	10.48	9.74
1911	11.80	10.70	9.48	8.74



SUPERINTENDENT H. L. LINGO AND THE THREE DIESEL-ELECTRIC UNITS OF HORTON, KANS., WITH OPERATOR ON PLATFORM IN FRONT OF THE ENGINE INSTALLED IN 1926

Mr. Lingo's article shows the value of good supervision over well-built heavy-duty equipment

BIG 6

"BIG 6" OR "SUBURBAN"

South Bend
Street Flushers

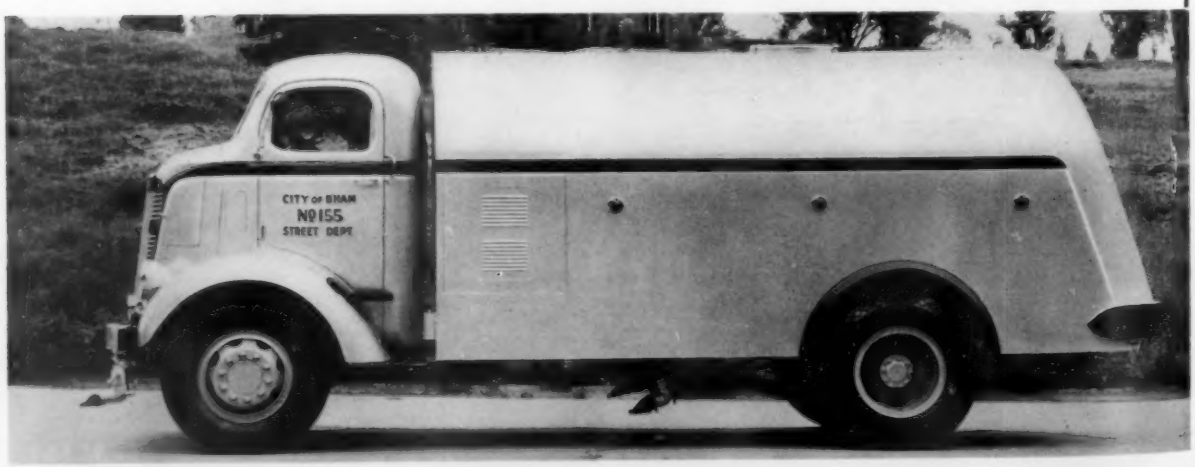
If your city is LARGE it's the "Big 6". If small — the SOUTH BEND SUBURBAN Model Street Flusher will be thoroughly competent to meet all your requirements.

Whichever you choose—

you are assured of satisfactory results:—a thorough job of removing from the pavement all types of street dirt, litter, leaves, etc. Cars parked along the curb do not impede the progress of a SOUTH BEND flusher, because the nozzles throw the spray *under* the parked cars, cleaning the entire pavement.

The *SUBURBAN* flusher, made in a range of capacities of from 600-2,100 gallons, cleans a strip 14 feet wide with one nozzle; 26 feet wide, with two nozzles; and 36 feet wide, with three nozzles.

The *BIG* 6 covers a wider range of capacities:—800-3,000 gallons. With one nozzle, it cleans a strip 16 feet wide; with two nozzles, 28 feet; and with three nozzles, in one operation, a strip 42 feet wide.



MUNICIPAL SUPPLY COMPANY
SOUTH BEND . . . . . INDIANA, U. S. A.

Jacksonville Broadcasts Talks by Street Cleaning Personnel

Cooperation Is Keynote of Three Successive Weekly Quarter-Hour Chats

ON March 24 and April 4 and 11 fifteen-minute radio talks were given by two Sanitary Inspectors and the Assistant Superintendent of the Street Cleaning Department of Jacksonville, Fla. Each talk had been prepared by the speaker and stressed the need for cooperation by the citizens to make the cleaning of streets and the removal and disposal of garbage and rubbish as complete and economical as possible.

The municipal radio station, WJAX, made a good spot available at 6:30 on the three dates mentioned, just ahead of the extensive hook-up of the well-known and popular news commentator, Lowell Thomas. That the talks were heard and appreciated has been evidenced by the number of telephone calls and letters received by the Department.

Ralph Hernandez, Sanitary Inspector, Speaks:

"Friends of the radio audience, I am discussing with you tonight a very important subject—that of keeping the streets of the city of Jacksonville clean. I know all good citizens are vitally interested in this undertaking, for each one of you has a civic pride in seeing our streets kept clean and sanitary.

"I wonder how many of you ever think when you throw paper or trash of any description in the street, just how much you are helping to litter our streets. . . . Another thing I should like to bring to the attention of our business houses in the downtown area is the practise of sweeping off the sidewalks into the streets. You have no idea what a great help it would be to the Street Cleaning Department of your city if each one of you, instead of sweeping into the street paper or any other matter that may collect on the sidewalks, would pick it up and put it into the garbage cans; it would mean so much help and would certainly eliminate to a great extent the unsightly condition of our streets. . . ."

Mr. Hernandez then told of the three motor sweepers which are used, but which are seldom seen by the citizens because they do their work at night. Attention was called to the push-broom men who are at work constantly throughout the day for 365 days a year. In a further discussion of the work of the Department he spoke of the trucks used for refuse collection, and noted the fact that they are covered to prevent loose paper and other material from being scattered over the streets and thus increasing the work of the street cleaning section. He pleaded that citizens who haul waste material through the streets should cover their trucks also and thereby aid the Department in maintaining clean streets.

J. A. Budd, Sanitary Inspector, Speaks:

"This is the second of a series of talks which are being sponsored by your Street Cleaning and Garbage Collection Departments. The talks are being made to acquaint you with the operations of these two departments, and also to solicit your cooperation and assistance in the work that these departments perform. Therefore, I am going to attempt to impress upon you the importance and necessity of the functions of these departments and ask that you good citizens of Jacksonville give us your fullest cooperation and assist us, not only to greatly increase the efficiency and the effectiveness of the work we are doing, but also to help us keep the streets and alleys of our city clean and beautiful."

This was followed by a plea for the elimination of improper and unsanitary garbage containers which break and cause spilling of the material and are difficult to handle because they are too heavy. He ended by quoting the ordinance that requires watertight metal receptacles of not less than 12 quarts and not more than 40 gallons capacity placed at the curb line in front of the property. Thanks were expressed to those who cooperated with the Department in the proper handling of the garbage.

Jacksonville provides for the collection of trash piled in the gutters in front of property. Mr. Budd asked particular cooperation in the piling of this in one large heap so that it would be easy for the men to pick up, and also that any coarse material such as wire or other unwieldy trash should be placed on top, and the smaller material at the bottom. Attention was called to the fact that some builders and owners fail to haul their own trash from building operations to the incinerators and, instead, leave it for the city trucks to pick up. The Department has been willing to remove this waste in the past when it was possible to do so, but with an increasing production of the materials they must move, and with a larger city area to serve, it has become practically impossible with the present equipment and budget to continue this outside service. The talk sought the aid of this group in not placing this added burden on the Department but caring for the removal themselves as required by ordinance.

N. M. Ulsch, Assistant Superintendent, Speaks:

"This is the third in the series of talks that is being sponsored by the Street Cleaning Department of this city. You may not know that the Department covers also garbage

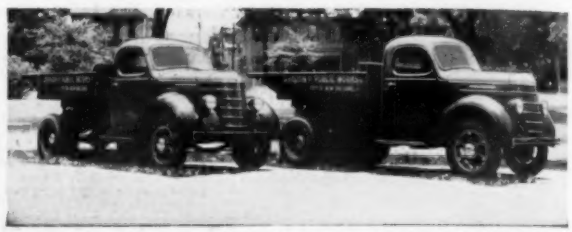
Mayor Robert S. Maestri (right) and Hampton Reynolds, chairman of the City Development Planning Board, are shown discussing one of the surfacing projects included in the big New Orleans public works program. Beside them is one of the many new International Trucks working on the new projects.

NEW ORLEANS PROMOTES PUBLIC WORKS

. . . with International Equipment on the Job

America is watching with keen interest the New Orleans program of rehabilitation and beautification. New public buildings, parks and other recreational facilities, bridges, covered canals, sewage and drainage systems, and many other projects, including the new Canal Boulevard, are emerging from the minds of men into realities.

International Trucks and Industrial Power have been called upon to aid in this important development. More than 50 International Trucks are now on this job. Most of them are on street projects. The rest are working for other departments of the city government. Motor graders and scarifiers powered by International have also been purchased to provide a well-rounded, efficient fleet of equipment to speed up the work. A small International Industrial Tractor is used for park maintenance.



Two of the 1½-ton International Model D-30 Trucks with rubbish bodies in the service of the New Orleans Division of Public Works.

New Orleans knows the value of good equipment. And International Trucks and Power are proving sound investments. Find out what this equipment can do on your work. The nearby International dealer or our Company-owned branch will give you the facts.

INTERNATIONAL HARVESTER COMPANY
(Incorporated)
180 North Michigan Ave. Chicago, Illinois

Below: Twenty of the fleet of Internationals operated by the New Orleans Municipal Repair Plant. These trucks are 2 to 3-ton Model D-40's with dump bodies. Internationals are working 24 hours a day on this municipal program.

INTERNATIONAL HARVESTER

collection and garbage disposal. In the two previous talks given over this station you have heard of the street cleaning work and a plea for cooperation between the citizens of Jacksonville and the Street Cleaning Department. I have selected as my subject tonight, Garbage and Incineration. . . ."

Mr. Ulsch then presented a detailed picture of the problems of the incineration of refuse and the improvements that have been made in the incinerators in Jacksonville through reconstruction, and the elimination of all odors from the destruction of the waste products of the city. No auxiliary fuel is purchased for use during the wet season, when watermelon, canteloupe and other watery fruits and vegetables predominate in the collected material. Instead, all the waste oil from the city trucks is saved with the old battery boxes and is used to furnish the extra heat required to dry out the refuse before it will burn. A considerable number of figures were given supporting the work that was done last year, and particularly showing how cost has been reduced. The cremation of all refuse cost only 56½ cents per ton in 1937 as against 65 cents in 1936. Garbage production has increased materially in the city—8,518.08 tons in one year.

In concluding his talk, Mr. Ulsch pointed out forcefully that the cost of collecting all wastes in the city and disposing of them by burning, the most cleanly method, cost each family only 1½ cents per day in 1937.

Comments

These talks have been recorded in part to acquaint our readers with what is perhaps the newest method of securing the cooperation of the citizen in the more efficient operation of a city department. The talks brought before the microphone three men from the Department, not smooth-tongued announcers, but men who knew what they were talking about and who were in contact with the citizens every day and knew what was needed to improve their work. They wrote their own broadcasts without flowery language, just as they would talk to a citizen who made a complaint about some part of the service. And there was not a taint of political talk in the three broadcasts the scripts of which it was our privilege to read in full, and the name of the Commissioner responsible for the operation of the Department was not even mentioned. The talks were genuine attempts of three earnest city employees to reach out to the citizens and tell them what they could do to help the men working for them to make the city a better place in which to live, in health, cleanliness and economy of operation.

T. R. K.—800.

Air-Conditioning and Water Supply

ALTHOUGH manufacturers of air-conditioning equipment have incorporated many improvements during recent years which are designed to conserve water, there are still local problems which militate against increased use of major water-consuming equipment in many cities throughout the United States, according to the recent report of the Marketing Research Division of the Bureau of Foreign and Domestic Commerce. Air-conditioning installations increased 1400 per cent from 1933 through 1936, according to trade estimates, and statistics evidence a continuation of this growth.

Since a considerable percentage of the air-conditioning equipment in use depends upon local water supplies for their cooling and conditioning agents, consumption of water for such purposes reaches a large volume during that part of the year in which the air-conditioning equipment is operated. Industrial use of water has also been increasing, and a number of cities have reported to the Department of Commerce that industrial demand, rather than air-conditioning, has been the major cause of increased consumption of water.

As a result of the increasing demand for public water service, a number of cities have been forced to adopt means to minimize the demand for such service, whether the demand originated with industrial manufacturing plants or with owners of large water-using air-conditioning installations. A number of methods to discourage great use of public water for such purposes have been adopted in various cities. In some cases an extremely high water rate has been used, while in others, especially for air-conditioning equipment, cities have required the use of cooling towers or other water-conserving attachments in all the larger plants.

While the problem of water supply is admittedly serious in some cities, the degree of seriousness is not common to all cities or to any group of cities regardless of size or geographical location. There are a number of cities wherein the available supply of water is barely equal to current demand, and wherein it is impossible to obtain large-quantity water service, or possible to obtain it only under such hazardous regulations or at such a rate as to make its use economically impracticable. Some city officials report that the further use of large water-consuming equipment would not only tax the capacity of the public water service in many cities but would seriously congest sewerage facilities.

The air-conditioning problem is eminently a problem individual to each city. The equability of climate, the maximum high and low temperature, the average of daily variations of temperature, the degree of humidity and the temperature of the water available, each have an effect upon the water problem. Thus, for instance, the study shows that in Seattle, Wash., where the average mean temperature during the summer months is rarely over 70 degrees, the market for air-conditioning equipment is largely limited by the climate itself, whereas there is great need for air-conditioning installations in cities like Washington, D. C., where the temperature and accompanying humidity causes discomfort to residents during certain periods of the summer season.

Expansion of water service facilities and sources of raw water are extremely costly and may seldom be accomplished quickly. Moreover, air-conditioning demand for water is almost purely seasonal, but if it reaches certain proportions a city is called upon to make large investments in plant and equipment which are a permanent expense but which are definitely an idle non-earning investment during a large part of the year.

The study covers cities of 20,000 or more population and, while designed to furnish manufacturers and distributors of air-conditioning equipment with an effective indication of the market possibilities in each city and thus enable them to plan their activities more efficiently, it does contain information which is very valuable to water-works departments and companies throughout the United States. The report, Market Research Series No. 17, "Effect of City Water and Sewerage Facilities on Industrial Markets," is available at 10 cents a copy upon application to the Marketing Research Division, Bureau of Foreign and Domestic Commerce, Washington, D. C., or any branch office of the Bureau located in the commercial centers in the United States.

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Municipal Land Reserves

European Experience—Needs and Opportunities in American Cities—Zoning and Taxation as Factors

By HAROLD S. BUTTENHEIM
Editor, THE AMERICAN CITY
and
PHILIP H. CORNICK
Staff Member, Institute of Public Administration

WHILE American cities have as yet done little to add to their land-holdings for other than immediate public needs, the experience of numerous European cities has demonstrated the wisdom of public land reserves. The acquisition of public land for housing purposes is reported from cities in Austria, Czechoslovakia, Finland, France, Germany, Great Britain, Holland, Italy, Norway, Poland, Spain, Sweden and Switzerland. Russia is, of course, the outstanding example of public land ownership, but more years must elapse before the Russian experiment can be properly evaluated.

Many municipalities in Scandinavian and Germanic countries have long held considerable amounts of land, some of it handed down from medieval times. In some countries this has been augmented by large grants from forests and estates of the national domain. In Finland, for instance, the State, up until the nineteenth century, gave land for founding towns, usually on condition that the full property rights should not be given to private individuals. Although this provision was modified late in the nineteenth century, towns still own practically all the land within their boundaries. By 1926, the total area of building sites sold by all Finnish municipalities amounted to only 3.5 per cent of the combined areas of all the towns. Helsingfors, with an area of 6,300 acres, owns 13,000 acres of land, much of it outside city limits.

From the end of the nineteenth century, municipalities in Finland, Norway, Sweden, Denmark, the Netherlands, Germany and Austria have pursued a systematic policy of steadily increasing their land-holdings both within and outside the city limits. Since 1904, the land acquisitions of Stockholm, mainly for housing purposes, have amounted to over 20,000 acres, or five times the area of the original city. The five next largest Swedish cities own from 47 per cent to 80 per cent of their administrative areas. Copenhagen owns over one-third of the total area within its limits available for building. Oslo owns a suburb that is twice the area of the city. The Hague possesses 4,408 acres, or 45 per cent of the city area. Zurich owns 5,621 acres, half of which is within the city.

Vienna owns more than 15,000 acres, exclusive of streets, or more than one-fourth of its area. Exclusive of streets and railways, Berlin has a municipal domain of over 75,000 acres within its limits, embracing more than a third of its area, and owns another 75,000 acres of forest and agricultural land outside the city proper. Most German cities own considerable tracts outside their limits, frequently larger than their holdings in the city proper. In addition to land for public buildings, parks and other uses common in American cities, German municipalities own extensive forests and agricultural estates managed either by the city or leased to private operators. In many cities, particularly since the war, much housing has been built on land leased or sold from the public domain.

All German cities over 50,000 in population own, on an average, 23.6 per cent of their municipal territory, excluding streets, railways and land used for sewage disposal and similar services. The average distribution by specified uses of this 23.6 per cent of urban land in 1933-34 was:

Use	Per Cent
Forests	39.9
Agriculture	39.9
Vacant property	5.6
Parks and gardens	4.8
Buildings	4.6
Miscellaneous	5.2
	100.0

In European cities public land ownership has resulted in considerably lower land costs for a variety of projects. In the case of Wythenshawe, the city of Manchester, England, acquired 3,710 out of the 5,567 acres at agricultural value before any building was started. The estimated saving of some $5,000,000 will result in considerably lower rents or smaller public subsidy. In Stockholm the city was able to counteract threatened inflation of land prices. In Copenhagen, land speculation was effectively controlled during and after the war by the municipality's selling its own land at low prices and also by extending other government aid to housing conditional on low land prices.

Greenbelts and Green Wedges

The folly of allowing further unrestricted expansion and disorderly sprawling of cities into rural areas, turning green fields and forests into dreary city streets and making the countryside inaccessible to the poorer inhabitants of the interior districts, is gaining increasing recognition both in America and in Europe. The greenbelt idea rests on the proposition that solidly built-up cities can be too large, that definite limits of expansion must be assigned, and that further growth in the region must take place in outer satellite communities separated from the central city and from each other by wide green spaces. This method of city growth is to be effected by the acquisition of a wide band of unbuilt land surrounding the city from which close building development is permanently banned.

A greenbelt not only limits the size of a community to a desirable maximum, but protects it from inharmonious encroachments. The greenbelt also provides much-needed breathing space to congested urban areas—a place where

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the smoke, dirt and grime of the city are dissipated and the oxygen content of the air renewed. In the greenbelt might be located playing fields, golf courses, lakes for boating and swimming, allotment gardens, larger farms, meadows and forests. The beauties and advantages of the countryside would be preserved on the very doorstep of the city.

Either in combination with greenbelts or alone, consideration should be given to the establishment of green wedges that would be gradually driven in farther and farther toward the heart of the city by acquiring land at their points. Such wedges would not only provide breathing space and recreational areas, but would serve as corridors leading out to the open country and as barriers between different parts of the city. The municipal forests that reach right into the heart of such German cities as Hanover, and many of the parkway developments in this country, such as the Westchester County Parkways in New York or Rock Creek Park in Washington, D. C., are good examples of green wedges.

Greenbelts are an integral part of the English garden cities, Letchworth and Welwyn, and of the new "greenbelt towns" of the Resettlement Administration in this country. Partial greenbelts or agricultural belts are found in many other planned developments in Europe.

Means for Acquiring Land Reserves

On the basis of the experience of European cities with extensive land-holdings available for general purposes, and of a small handful of American cities with lands suitable only for specialized purposes such as docks, a strong case can be made for the acquisition by the municipalities in this country of land reserves suitable for other than street and park purposes. One large question remains to be answered: How can such lands be acquired?

The Federal and state governments have no holdings of urban lands which could be granted to the cities. That fact at once removes the possibility of building up future municipal land reserves in this country from the chief sources of such reserves in the past.

Proposals have been recently made that the Federal Government should give grants-in-aid to municipalities to purchase land for housing purposes. Parallel proposals for relaxing the constitutional restrictions on the powers of state governments, with a view to permitting them to make loans and grants to municipalities for the purpose of acquiring and developing lands for low-cost housing are under consideration in several states. Some students of the financial history of state governments show a tendency to doubt both the wisdom and the effectiveness of these proposals. They point out that the existing limitations on the powers of state governments to incur debts, and on the purposes for which moneys may be appropriated, grew out of the extravagant exercise by the states of their previously unlimited powers to borrow and expend money for purposes which in their day were considered not only "public" in character, but essential to the development of the local governments.

It is in recognition of these facts that a third proposal has developed its ardent advocates. Under this plan, the limitations now imposed on the rights of municipalities to borrow, and on the purposes to which they may apply the proceeds of their bond sales, are to be modified, in order to permit them to acquire and develop lands for municipal housing projects. The fact that, when all local expenditures are taken into account, very few cities have been able to expand their revenues sufficiently to obviate the necessity for borrowing in order to meet recurrent annual expenditures of a non-capital nature, casts doubts on the adequacy of this plan of financing the acquisition of municipal land reserves.

Municipalities are not, however, wholly and forever debarred from acquiring lands suitable for general purposes, and from holding them as a reserve until the need for their use arises. In fact, without intending it, a large number of municipalities have already bought extensive holdings of lands within and near their borders, and have paid for them in full out of current revenues during a number of years past. All that remains is for them to take title. Since the holdings were acquired unintentionally and therefore planlessly, they are heterogeneous in character, and dispersed in location. Even after cities take title, some time must elapse before they can ascertain the uses to which the lands are adapted, and before they can take the necessary steps to consolidate their holdings by exchanges with the private holders whose lands now lie interspersed with the lands which already constitute a public land reserve in fact if not in name.

A New York State Study of Premature Subdivisions and Tax Delinquency

A report by Philip H. Cornick issued in 1938 by the New York State Planning Council, which presented information on the central cities and on certain of their suburbs in the four largest metropolitan districts of the state, corroborated the findings of the pioneers in the field.

The areas subjected to scrutiny included 8 cities, 50 villages, and 62 towns, ranging in population from New York City with almost 7,000,000 inhabitants to the remote town of Poundridge with only 602. Except for a few compactly built villages, excessive subdivision was evident in all, but had been carried to greatest extremes in the suburban towns adjacent, or in close proximity, to the central cities of the four regions.

Another section of the study dealt with the arrears of taxes and special assessments in 5 cities and 47 towns. More than half of the 292,901 vacant lots were found to be in arrears—162,972, to be exact. The total unpaid taxes and special assessments, exclusive of penalties, in the 52 cities and towns, amounted to $34,567,307, of which the vacant lots were responsible for slightly more than two-thirds.

With respect to duration of arrears, a sample of 100,506 parcels of vacant land, lying in 3 cities and 25 towns, was distributed by year of first delinquency. It developed that 62,501 of these vacant lots had already appeared on the tax lien registers in 1931; 18,863, as long ago as 1926. The problem revealed by the analysis of arrears is not a new one, but had been growing up unobserved for decades. This fact is further demonstrated by isolated, old subdivisions lying in outlying towns in which every lot has remained vacant since the year of the subdivision, and in which every lot has been in arrears for between 30 and 40 years.

In the great majority of the areas studied in New York, the law provides that the liens for unpaid taxes shall be

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offered for sale at public auction. That practice had been followed in all the sections included in the study, but very few liens on vacant lots and lands proved saleable. They remained in possession of the city, town, or county, depending on the provisions of the general or special laws in force in the area. The liens remained unsaleable partly because the lands themselves had little value for urban uses; partly also because of the time and money required for the foreclosure of the liens. The same obstacle long stood in the way of foreclosure by the governmental agencies which held the unsaleable liens.

None of these local governments has yet realized the advantages of holding these lands in reserve. Each is trying to sell them, allowing the purchasers to pick and choose more or less at random among the public holdings. Evidence is accumulating, however, that the excessive number of lots involved will be no more readily saleable as lots by the local governments involved than they proved to be in the hands of the former owners; and that replanning and replatting must precede any successful program for putting the lands to use, whether in public or in private hands. When those facts shall have been demonstrated by experience, it is to be hoped that the planners may succeed in guiding the local governments to a realization of the wisdom of withholding selected areas not only from sale, but also from dedication to permanent park and recreational uses.

Much remains to be done before the local governments can acquire valid title to all the vacant lands for which they have been paying the price throughout many years. With all the progress that has been made, foreclosure costs remain disproportionately high when the values of the more poorly located lands involved are taken into account. A carefully drafted bill designed to reduce these costs to a minimum was introduced in the Legislature of New York at the last session, but failed of passage. The caliber of the committee which drafted it is such as to commend the bill to municipalities in other states which are confronted by analogous problems.

Whenever foreclosure costs can be reduced, municipalities in state after state will be in position to take title to extensive land-holdings—holdings which in fact they have already bought and paid for.

The Bearing of Zoning and Planning Procedures

Zoning boards and planning commissions had been established in most of the urban and suburban municipalities of New York for which the study was made. They had certainly done little to guide or check the madness which led to the waste of public and private funds in the premature subdivision of rural lands for urban purposes. There is even some ground for the belief that the widespread tendency to overzone helped to accentuate the madness.

When all the outlying lands within our city limits and for miles and miles beyond their boundaries are zoned for uses to which they cannot possibly be adapted, we are courting disaster. Worse still, we are depriving the existing uses of the protection to which they are entitled, and without which many of them must disappear; and we are providing bait for suckers to be used by shoestring promoters of so-called home developments on which no real home can ever exist.

In order to stabilize values in such areas, and to protect existing uses against incompatible and destructive intrusions, we shall have to learn that zoning of the conventional urban type is wholly inadequate in many suburban and rural areas, whether those areas exist inside or outside the city limits. In order that such areas may have the benefits of zoning, we shall have to learn how to bridge the existing gap between the most intensive use for which provision is made in the rural zoning ordinances of Wisconsin, and the least intensive use characteristic of developed urban centers. The problem is how to provide for the many, varied, and indispensable uses which lie between the two extremes.

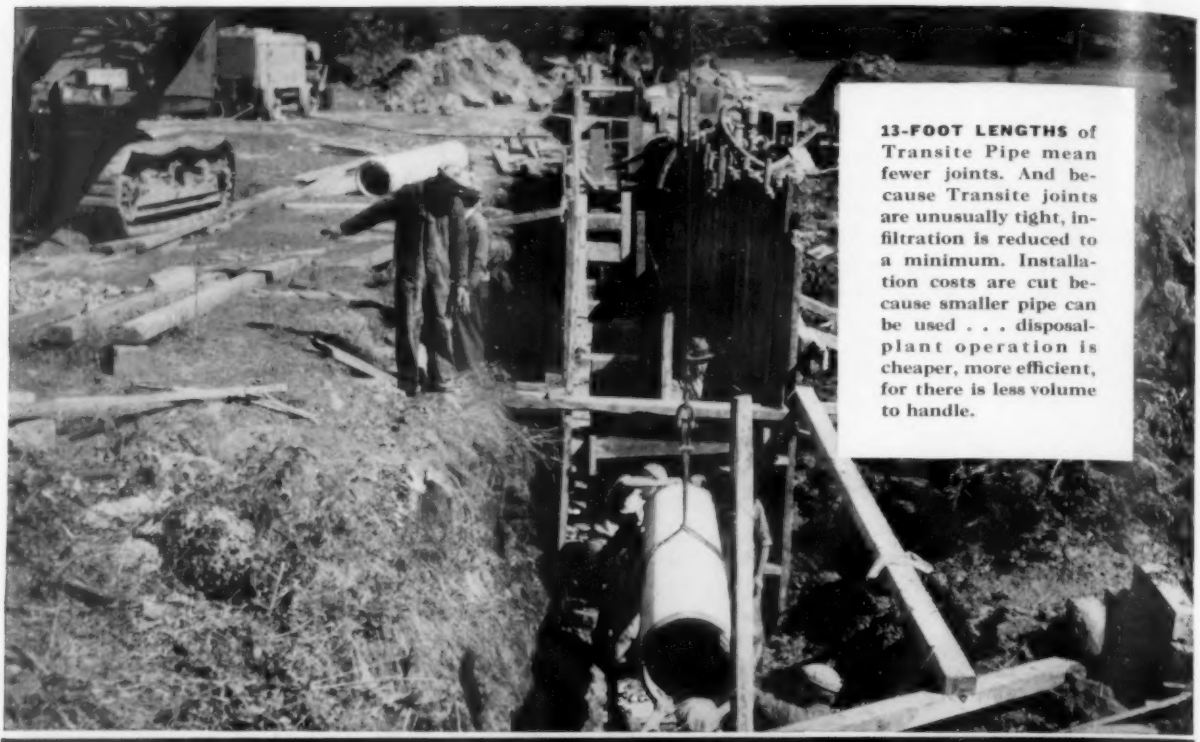
The Place of Taxation in the Problem

Only philanthropists—and few of them—will undertake operations for low-rent housing when they know in advance that increased taxes on the property must be deducted from the rigid gross rents before any allocations can be made to operation and maintenance, or to the fixed charges on invested capital. In short, we subsidize those who maintain slum dwellings and penalize those who would replace them. As long as we persist in maintaining this absurdity in our existing tax system, we shall make little progress in clearing our slums beyond the extent to which the Federal or state governments take over the task or provide subsidies sufficient to offset the effects of the penalties imposed on the private builders who might otherwise attack the problem as a business venture.

It is possible to devise a system of local property taxes which would decrease costs of construction, and of operation and maintenance, and thereby increase industrial activity, employment and the effective level of wages. By progressively lowering the rate of taxation on buildings and increasing the tax rate on land, such a system would decrease the tax burden on home owners and on tenants of low-rent housing projects and would advance the public welfare through properly penalizing those who would hold desirable land out of use in order to speculate on the chances for sale at a profit when more intensive uses become possible. It would thus become an effective weapon against the forces which today make it almost impossible to obtain public acceptance of a zoning ordinance which does not set aside for business, for multi-family residential uses, and for single-family uses, larger areas than can ever be used for those purposes; and which enable holders to maintain the prices of unused or partially used lands in each zone at levels so far above capitalized earning power that the adequate development of the lands becomes economically impossible.

Excerpts from a paper presented at the National Conference on Planning, held in Minneapolis, Minn., June 20-22; a joint conference of the American City Planning Institute, American Planning and Civic Association, and American Society of Planning Officials. Much of this paper is based on the as-yet unpublished report to the National Resources Committee of its subcommittee on "Land Policies for Rational Urban Development," and on the report on "Premature Subdivision and Its Consequences," recently published by the New York State Planning Council.

A more comprehensive presentation of this subject of Municipal Land Reserves will appear in the forthcoming Proceedings of the National Conference on Planning and in the American Planning and Civic Annual; also in the August issue of the *Journal of Land and Public Utility Economics*.



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Forward Steps

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Municipal Officials, Chamber of Commerce Executives, and Others

Scale Model of a Waterfront Development

DOBBS FERRY, N. Y.—The Planning Board of this village recently placed on exhibition a model showing in detail how it is proposed to develop the waterfront area now being filled-in west of the plaza at the New York Central, Hudson River Division, station. The present area being filled comprises three grants of land under water from the state, aggregating approximately four acres. An additional grant required to complete the area for recreational development will provide for the village a total of six acres to be enjoyed by the public.

A bridge for automobiles and pedestrians is proposed to pass over the railroad tracks at the foot of Old First Street, and a ramp will permit automobiles to enter the station plaza from the north instead of from the hazardous south entrance used at present. Pedestrians may enter the landscaped area by a stairway from the west end of the proposed bridge.

Shaded walks converging on a central circular motif, providing a substantial base for a flagpole, have been laid out with a view to comfort for those who seek relief from the summer heat. Swings, chutes, sand-boxes and a wading pool for children are shown on the model, as well as a structure combining bathhouses, rest rooms, refreshment counters and a covered open-air upper observation deck. The proposed bathing beach shown is made of real sand from Jones Beach on Long Island. The Garden Club of Dobbs Ferry has interested itself in the matter of landscaping the area and has made valuable suggestions as to the layout on the model.

New proposed parking areas are shown, and small automobiles, three-quarters of an inch long, dot these spaces on the model. The several houses existing on the slopes east of the station are shown to scale and add to the interest of the model.

As a final touch, provision is made for the protected landing of small boats in enclosed basins with floats, and for larger boats at a central permanent pier 30 feet wide and 80 feet long. The latter is connected to the land by an arched bridge so that small boats may pass back of the pier.

The proposed development started to take form under a Civil Works Administration project in 1934, and an engineering survey completed then permitted the workers, under the direction of F. Morton Clark, to lay out the topographical detail which formed the foundation of the model. No relief workers were available who understood culturing the model, working up the minute detail, therefore that phase of the work was held up until the early part of this year, when Mr. Clark became available to complete the model. Plans have been discussed to loan the completed model for educational purposes and to place it on exhibition at the 1939 World's Fair if such an arrangement can be made.

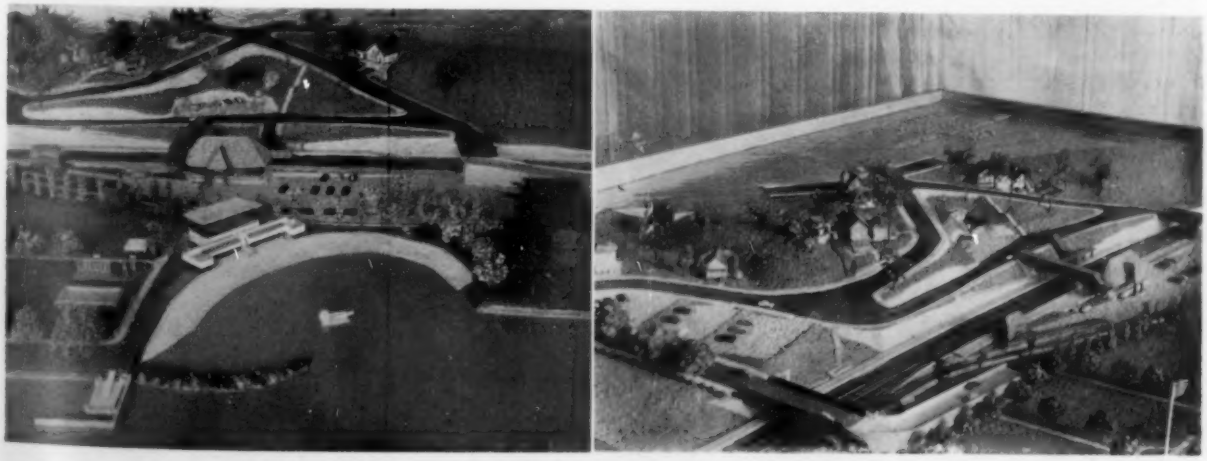
F. MORTON CLARK,
Planning Engineer.

A Campaign to Stimulate Building

COLUMBUS, OHIO.—At the end of March this year, the relief load in Columbus reached approximately 6,500 families. The city treasury, in common with the other city treasuries throughout Ohio, struggled with a deficit. Business, particularly in the building trades, was at a low ebb.

Mayor Myron B. Gessaman called into his office the leaders in the building trades industries in the city and presented a plan to excite business and increase employment. Said he, "Sixty-five hundred families are looking to the city of Columbus for their bread and butter and for clothes and a place to stay; you men want business; let's get together and start business." His plan was accepted by the group of business men, and the program was started. An old deserted shack, nearing the century mark in age, was donated by one of the local real estate firms and moved to the front of the

THIS WEATHERBEATEN EYESORE IN COLUMBUS WAS TRANSFORMED INTO THE ATTRACTIVE HOME SHOWN ON PAGE 77



MODEL OF PROPOSED WATERFRONT DEVELOPMENT AT DOBBS FERRY, N. Y.

At left, recreational area, with bathing beach and enclosed basins. At right, remodeled approach to the station plaza, planned to eliminate existing hazardous conditions

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Not the least of the problems at Winchester has been the proper sterilizing of new mains. Like hundreds of other water works men throughout the country, Mr. Sanderson uses HTH for this important job with "very satisfactory results".

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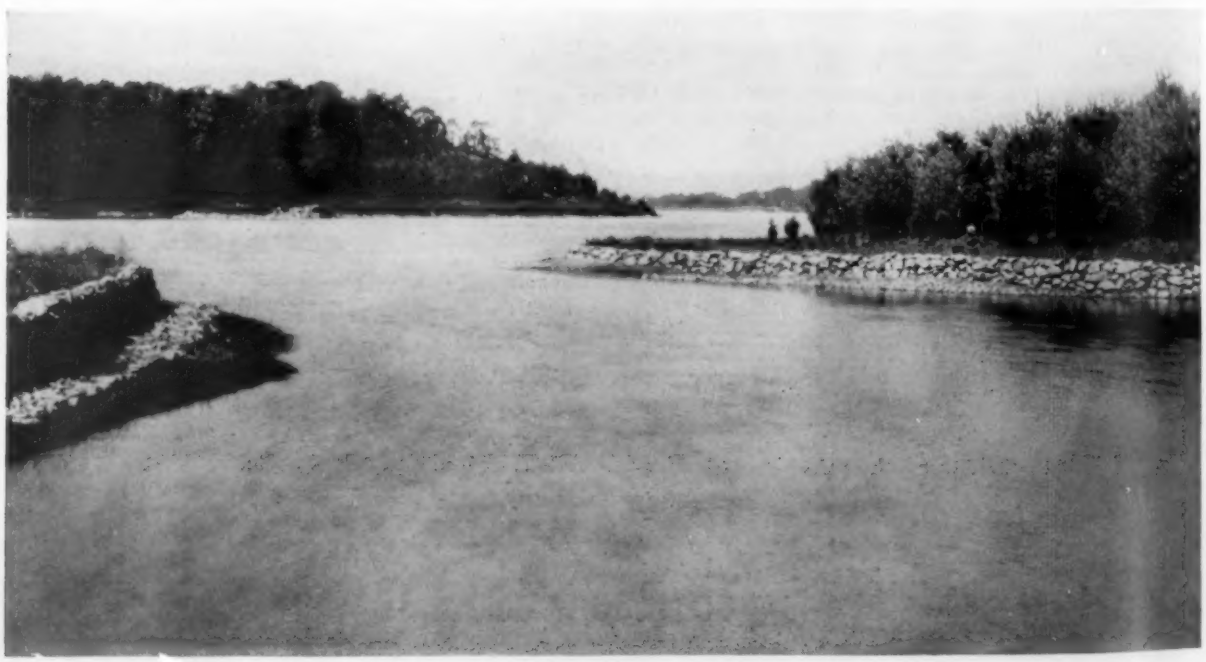


City Hall lawn, there to be rebuilt into a beautiful home.

For several days the old, weather-beaten eyesore rested on the trucks on which it rode from the back street where it had been standing for more years than most men live. People passed and commented. And the comments ran the gauntlet from severe criticism to lavish praise for the Mayor and his committee. Before long the house was lowered onto a temporary concrete block foundation, and work was started to make a shack into a home. Lath and plaster and the dirt accumulation of decades was hauled out and away. Old, weather-grayed roofing and blackened siding were ripped off. But the framework was as solid as the day it went into the house and the sills and joists were straight and true.

Construction and Conveniences

Insulite sheathing was laid under the redwood siding. Plasterboard formed the base for the paper inside. The rickety, closed-in staircase was replaced by a beautiful open stairway. A fireplace with a natural-wood mantel went into the living room, and hardwood floors were laid over the original flooring.

The kitchen has become a heaven for woman. It has been provided with all the cupboards any woman could request, and the sink and stove and table are placed so that the fewest possible steps are required during the preparation of the family meal. The dinette is large enough for a small family. Upstairs there are two fine bedrooms and a bathroom. The heating ducts exhaust from newell posts upstairs, and every possible new and modern efficient lighting and plumbing device has been installed.

A dormer has been built into the front of the house, and below it a small porch. Few homes are so well constructed. No house has ever created more excitement than the "Build Columbus" house.

The result of the activity and the publicity is apparent to anyone driving around the city. New houses are being built, some of them much like the City Hall house. Lumber yards are being besieged with requests for estimates on remodeling and repairing jobs. Painters are rushed. Building in May increased 8 per cent over the preceding month in Columbus, while other cities reported a loss.

Now that the house has been completed, tickets are being sold at 10 cents each giving the holder the right to inspect the building, and a chance on the house. The drawing is to be held on the fifth of July, when some extremely fortunate person will win one of the finest small homes in Columbus or any other city.

The compaign was the product of individual effort and private enterprise, and there are no bonds to be retired. Its success merits the attention of other American cities.

ALBERT B. GREGG.

THE "BUILD COLUMBUS" HOUSE, INTO WHICH THE SHACK PICTURED ON PAGE 75 WAS TRANSFORMED AS AN LESSON TO STIMULATE BUILDING

THE PROPOSED MUNICIPAL AUDITORIUM FOR LITTLE ROCK

An Up-to-Date Auditorium

LITTLE ROCK, ARK.—This city will soon let a contract for the construction of a municipal auditorium. It is estimated that the total expenditure for this building, including the land, will be approximately $760,000, on which a PWA grant of 45 per cent has been obtained. The building is designed for a seating capacity of approximately 3,000 in the main auditorium, and approximately 2,500 in the exhibition hall, and includes a little theater seating about 300. The loan and grant was made to the city after an election was held in January, 1937, when the public voted nearly 3 to 1 for a general obligation bond.

R. E. OVERMAN,
Mayor.

Merchants Pledge Themselves to Park Off Streets

UPPER MONTCLAIR, N. J.—The parking problem in Upper Montclair (population 15,000) became acute. Merchants complained. Shoppers complained. It was discovered that one business house alone had 14 cars parked on the streets all day.

A resolution was signed by every member of the Business Association, representing 85 per cent of the merchants, agreeing that all personal as well as employees' cars would be kept off the streets. Each merchant and business man pledged himself to the agreement in writing, and this pledge will be renewed and re-signed every three years.

Then the question arose as to what to do with these cars. Inspection revealed that behind the stores on either side of the main street, extending the full length of the center business block where the traffic was most congested, space was being used for storage and rubbish. On one side of the street this space was owned by one individual. He was prevailed on to clear it and provide parking space for all cars of the people working in that block. The property behind the stores on the opposite side of the street was owned by various individuals, who contributed $50 to $150 to make a similar improvement. The Business Association members then pledged themselves to

SPECIFY STREAMLINE

TRADE MARK REG. U. S. PAT. OFFICE

COPPER PIPE AND FITTINGS

- *Rust Proof*
- *Vibration Proof*
- *Corrosion Proof*
- *Clog Proof*
- *Leak Proof*

The Mueller Brass Co., Port Huron, Michigan were the first to originate Copper Service Pipe in America. This product has always been made by this Company at Port Huron, Michigan. For identification purposes the pipe is marked every few inches throughout its length as illustrated here.

●

TYPE M PIPE IS MOST GENERALLY USED FOR CONSTRUCTION PURPOSES; TYPE K FOR WATER SERVICE WORK.

COPPER PIPE PLUS BRONZE SOLDER FITTINGS PRODUCE THE

● When your plans call for pipe and fittings on new work, remodeling city projects or for water service lines, investigate STREAMLINE Copper Pipe and Solder Fittings before you decide.

STREAMLINE compares very favorably in cost with ferrous pipe, yet, with the exception of abnormal soil and water conditions, it never has to be replaced due to rust or clogging. The pipe joint is actually the strongest point in the line—constant vibration, resettlement of the fill, etc., has no effect upon it.

STREAMLINE Service Pipe (Type K) is the original copper service pipe, and the first to be produced in America for water service work. It is the most uniformly soft and pliable pipe possible to obtain—it is kept that way through the use of the best copper obtainable for the purpose and through strict laboratory control through every phase of its manufacture.

STREAMLINE Fittings and Type K Copper Pipe are the ideal materials for water works use; for many applications in filtration plants; in aeration lines and in heating coils using the sludge digestion system in sewage disposal plants—and for all general plumbing and heating purposes.

MOST PRACTICAL PIPE-JOINT

STREAMLINE
PIPE AND FITTINGS DIVISION
MUELLER BRASS CO.
PORT HURON, MICHIGAN

When you write for that catalog, kindly mention THE AMERICAN CITY.

THE CARS OF MERCHANTS AND THEIR EMPLOYEES ARE PARKED IN THIS SPACE BACK OF STORES IN UPPER MONTCLAIR, N. J.

permit no front-door deliveries, thus eliminating obstruction by trucks on both sides of the street. Similar cooperation was accorded on other blocks.

To make an even greater accommodation available in the business district, it has been decided to double the parking area alongside the railroad station, two blocks from the business center.

G. C. Chapman, Secretary of the Association, states that now there is a constant shifting of cars belonging to shoppers. The one-hour parking signs appear to be observed. Says he: "I believe the cooperation of the business interests of Upper Montclair has been due to the fact that they are practically all members of the Association, which campaigns against selfishness and devotes itself strictly to the betterment of business in the town."

A. ROWDEN KING.

A Street System Adjusted to Large Lots

To the Editor of THE AMERICAN CITY:

Massachusetts now has seven towns in all or large portions of which 40,000-square-foot or 1-acre lots are required. A number of other places require lots of 15,000, 20,000, or 30,000 square feet in part or all of their areas. The ordinary street system with streets 200 or 300 feet apart is not adapted to this kind of development. There have been many laws or regulations providing that streets should be not over so far apart, but there seems to be no instance where a minimum distance between streets has been set.

Desirable Proportion Between Width and Depth

The obvious purpose of large lots is to develop spaciousness and a condition which will satisfy people who want an open type of development. Large lots should not be too narrow, and they should not be too wide. Narrow lots miss the purpose of large-lot requirements, while too-wide lots are unduly expensive for streets and utilities. Some proportion between width and depth should be maintained, because of the economic and other advantages secured. A 40,000-foot lot 150 feet wide would be 266 feet 8 inches deep; if 125 feet wide, it would be 320 feet deep. This would necessitate streets 533 feet 4 inches apart or 640 feet apart. There is probably not yet enough experience with this type of layout to definitely disclose just what are the most desirable and effective proportions for a lot of such size. If anyone has had such experience, it would be helpful to discuss it. It may be that there will be personal preferences, some people liking a little more land on the sides of their house and a little less in the rear, although it would seem as though a 150-foot width would, all things considered, produce the best results.

A lot reasonably wide will have a depth sufficient for outdoor living, play, garden, fruit or other trees, according to personal wishes.

Definite lot widths are not a safe requirement except on level land with a gridiron layout. Where the land is hilly and the streets are curved according to the contours, as they should be, it is possible to have even the best lots with only a small frontage on the street. They would have the necessary area, they could be properly proportioned, but they would often have five sides, and probably just as often only three sides.

When we try to do the grand thing, we should not do it with a 40,000-foot lot 60 or 75 feet wide.

For the best results in all respects, what are the most desirable proportions for a 40,000-foot lot, recognizing that on curved streets there will be many variants?

E. T. HARTMAN.
14 Beacon Street, Boston, Mass.

"Civic Home-Making" in Memphis

To the Editor of THE AMERICAN CITY:

A news note in the June number of THE AMERICAN CITY, describing beautification work in El Paso by women citizens, was of much interest to me. We have a similar program in Memphis.

Our City Beautiful Commission was created in 1930 to improve the health, sanitation, safety, beauty, and cleanliness of Memphis. It is composed of 20 women leaders in the community, who serve without compensation.

This board is a permanent part of our city government, functioning as a bureau under the Mayor's Department of Administration and Health. Members are nominated by the Mayor, who designates the chairman, and the appointments are approved by the City Commission. The city provides offices in the Memphis Museum building, a paid secretary, and overhead expenses. The Park Commission's landscape architect devotes part time to this program.

The City Beautiful Commission reaches the body of citizens through its extension division, which has a chairman in each of the city's 52 civil wards. Working with groups in their own wards, these chairmen come together for meetings at headquarters once a month. Constant newspaper and radio publicity also plays a large part in keeping public interest alive.

Features of the Work

The bureau's work is very effective. As a result of a drive to spread the planting of crape myrtle, the city's official shrub, 15,000 plants are flowering over Memphis. An Adopt-a-Lot program last summer converted 400 unsightly vacant lots into tennis courts, play fields, croquet grounds, and gardens.

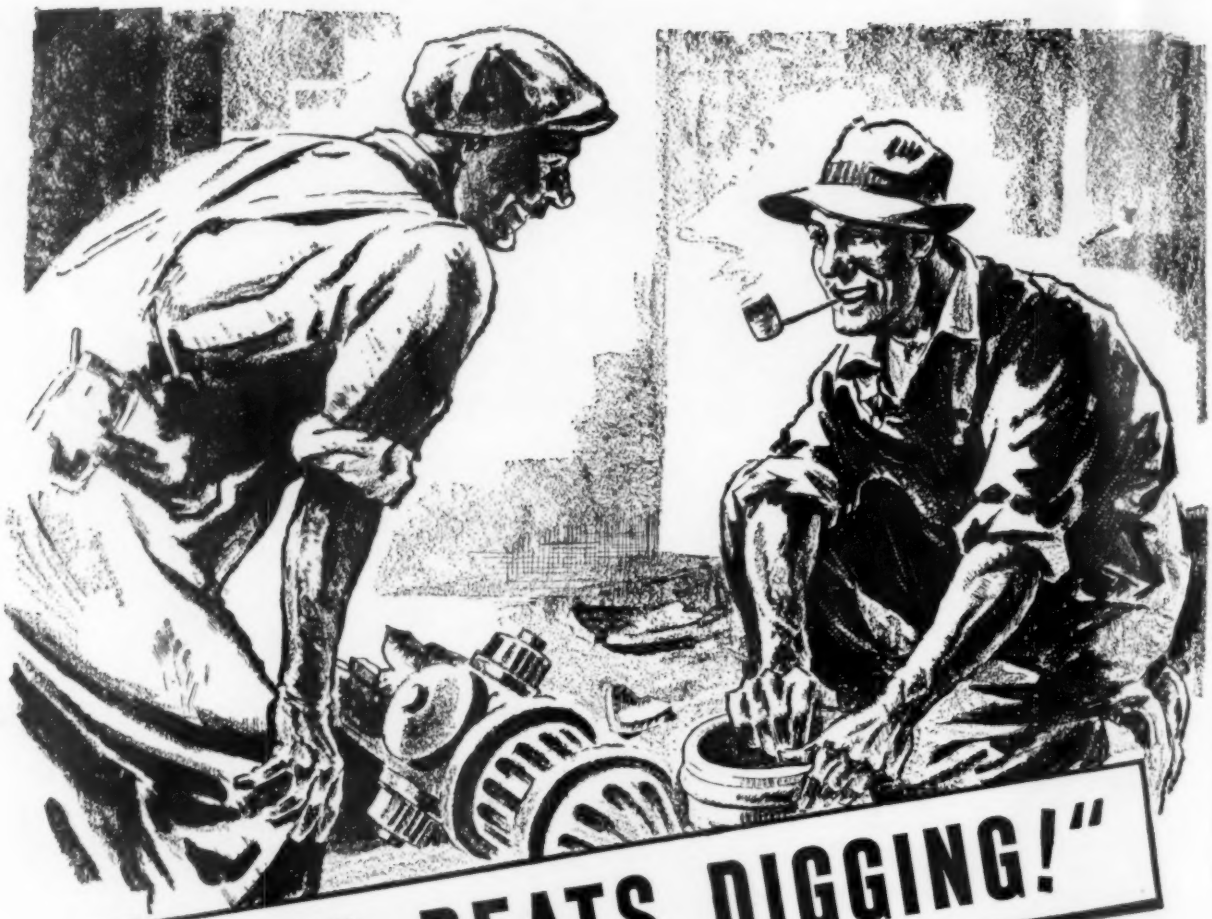
Annual events are Better Homes Week, cooperation with Fire Prevention Week, and the outdoor Christmas lighting contest, in which 200 trees were entered last year. Magnolia Tribute Circle, around a lagoon in Chickasaw Gardens, is a project established in 1932. Each of 56 magnolias is named for a distinguished citizen.

The City Beautiful Commission sponsors exhibits at the Mid-South Fair and a float in the Floral Parade of the annual Cotton Carnival. Last winter a free class in making Christmas decorations was held, with the associate editor of *Better Homes and Gardens* magazine as teacher. Recently a lending library on beautification was opened at headquarters.

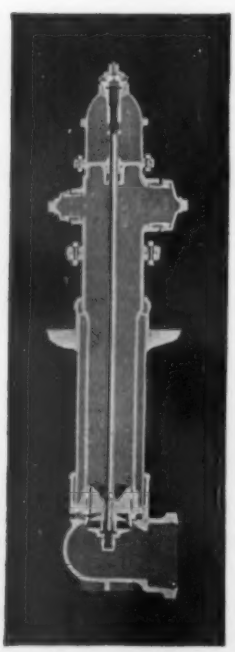
Most effective in its transformation of the city's appearance is the less spectacular work in the wards, where individual homes and their grounds have been improved by patient endeavor.

I may add that my initial interest in this program sprang from the realization that our riverfront was presenting a poor glimpse of Memphis to passing trains. We have wiped out the dump heaps, substituting a million-dollar Riverside Drive and twin parks along the harbor. I cannot express too strongly my belief that improving the appearance of a city pays great dividends in civic morale, just as good housekeeping benefits a family in the home. And "civic homemaking" is certainly a woman's ideal job—our women citizens have demonstrated that!

WATKINS OVERTON,
Mayor, City of Memphis, Tenn.



"THIS BEATS DIGGING!"



● We'll say it does! Just figure the time you'll save lifting a five-foot barrel up through its protection case rather than digging a five-foot hole. Picture the money you'll save repairing a smashed Mathews (new or old) in 15 minutes, as opposed to old-fashioned methods. Imagine the increased fire protection when you inspect, repair, renew, or modernize with this time-saving advantage.

Specify Mathews, the only hydrant made with a loose protection case. You can remove the entire barrel and all working parts. You can repair all troubles and *not* dig. Your community can have absolute assurance and uninterrupted protection. Write for the whole story.

MATHEWS HYDRANTS

Made by R. D. WOOD COMPANY

Manufacturers of Sand Spun Pipe (centrifugally cast in sand molds) and R. D. Wood heavy-duty gate valves for water works

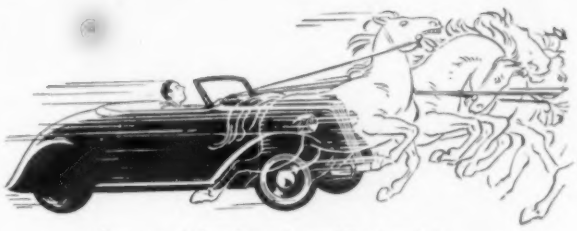
400 CHESTNUT STREET, PHILADELPHIA, PA.

Traffic Control and Facilitation

Conducted by Publications Committee, Institute of Traffic Engineers, 1 Park Ave., New York
Paul L. Green, Chairman; George W. Barton, Kenneth W. Mackall, Miller McClintock, Robert A. Mitchell, William R. McConochie, Arnold H. Vey, Joseph L. Wehmeyer, William A. Van Duzer, Thomas J. Seburn, Roger L. Morrison, Otto K. Jelinek, William C. Brandes

Providence Goes 111 Days Without a Fatality

By RALPH EATON
Traffic Engineer, Providence, R. I.



Courtesy of American Automobile Association

WHEN Providence dropped to fifth place in 1937, after standing first in its class during 1933-36 in the National Traffic Safety Contest, persons near and far asked us what we were going to do about it.

Well, on December 1, 1937, the Providence Traffic Safety Campaign was put under way by the Bureau of Police and Fire, with the Deputy Superintendent of Police in charge of a special office. The campaign was announced to continue six months.

Local newspaper support had been secured, and the slogan was "Not over 25." Providence is an old, compact city with few broad streets and 25 mph is fast enough for them. Letters were written to the pastors of all churches, to all civic and luncheon clubs, to many neighborhood and political clubs, and to numerous other organizations, and copies were placed under the glass of bureaus in a large number of hotel rooms. Another letter was written to householders, and distributed by the police to over 60,000 residences, as well as to 18,500 students in schools. A courtesy card, explaining the campaign, was distributed in December. Cooperation, not fear, was the emotion we sought to arouse, and the response was a 44 per cent reduction in the number of injured in the first month. The figure for the six-months period was 46 per cent, and 43 per cent for fatalities.

High Speed Dropped

The monthly "sampling" of speeds of 3,000 cars at 52 locations showed that the number of cars operating over 25 and up to and including 30 mph were reduced by about one-seventh; cars operating over 30 mph were reduced by a little more than three-quarters.

In the monthly sampling of obedience to "stop" signs there was similar evidence of public cooperation. Records of 3,000 cars a month at 48 locations showed that the percentage who were disobedient (compared with the average of four previous years) was reduced by a little more than one-quarter, reaching a figure of 5.1 per cent during the six months of the campaign. One phase of the work of the campaign was so successful that it should be specially mentioned: As the 50th day after the fatality of February 7 approached, it was announced that if we reached the 50th day without a fatality it would be celebrated by placing armbands on the police officers, and tags on the police cars, bearing the number "50." This was done, and so caught the public fancy that it was done again on the 60th, 68th, 82nd, and 100th days. A large banner with the proper number was spread on the front of City Hall.

On the 100th day a broadcast by officials on a national hook-up was conducted—this on May 18. We celebrated again on the 114th day (June 1); and then on our 125th day, a little boy who had been injured on May 29 and had apparently recovered died of an embolism. This threw the record back to 111 days. So far as is known, no comparable record has been made elsewhere—our own previous record having been 67 days, made in 1933.

The Incentive Saved Accidents

There may be a question as to the wisdom of too much emphasis on the item of fatalities, but it is certain that in this case it was a most effective device. The public at large was following the record day by day, and I am certain that the device saved accidents—perhaps even lives.

The six months are over; but a psychological condition has been developed whereby public as well as officials are determined to keep up the good work. We are going to try to hold it.

Solving Traffic Problems on the Facts

By D. GRANT MICKLE
Manager, Traffic & Transport Department,
Jensen, Bowen & Farrell, Consulting Engineers,
Ann Arbor, Mich.

PRESSURE was brought to bear upon a Governor and the State Roads Commission to build grade separations that would have cost up to $600,000. A traffic engineer reported that traffic-actuated signals would obviate the hazards at a cost of less than $10,000.

A modern progressive signal system 2.3 miles long was installed in a Mid-Western city at a cost of $45,000 and a saving of 134,582 car-minutes daily.

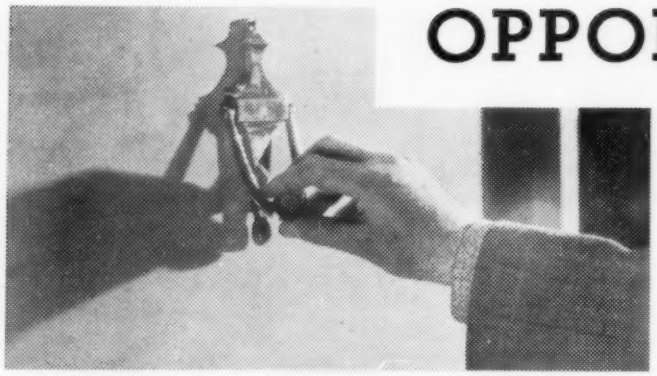
Traffic engineering can save money for the community.

In a report of traffic conditions in Toledo, Ohio, it was shown that traffic-accident losses amounted to $1,022,325 annually, as compared with annual fire losses of $311,802. Yet the public expenditures for services designed to cope with these losses were not at all in proportion to their amount. More than two dollars was allotted to the fire department for each dollar of actual fire loss, while the traffic control and betterment services received only 34 cents for each dollar of estimated traffic damage loss.

Traffic engineering may be defined as programming the movements of persons, vehicles and merchandise so that they are coordinated and made regular and safe. The fundamental factors to be considered in making such a program are the location and concentration of population; the location of industries, offices and retail establishments; the extent, kind and location of recreational centers; the location and arrangement of the thoroughfare system; the type of land use; mass transportation facilities. The relation of these factors to one another, and their influence upon congestion and accidents,

OPPORTUNITY KNOCKS !

$ $ $



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Act now on this opportunity to secure—at LOW interest rates and on LONG time bonds—the funds you need to

—modernize and extend your water works system

—lay new pumping lines

—increase your filter plant capacity

—irrigate your Parks and Golf Courses

Water Works heads the list of approved projects—not only because they are self-liquidating and retire their own bonds—but they

—provide a vital public necessity
—safeguard health conditions
—reduce fire insurance rates
—increase property values and promote civic growth

McWane Makes CAST IRON PIPE in All Sizes!

McWane can furnish pipe for your *complete* installation—all sizes 1¼" through 12". Precalked Fittings, too! Shipments now from stock!

Sand Cast Inside and Outside

McWANE CAST IRON PIPE COMPANY

BIRMINGHAM, ALA SIZES 1¼" THROUGH 12"

Chicago, Dallas, Denver, Kansas City, New York, Portland, Ore. Salt Lake City, San Francisco, Los Angeles

again WATER WORKS heads the list of approved projects

Don't experiment! Stick to the standard! Make sure of the low maintenance cost and long life of every foot of pipe that goes into these installations.

Cast Iron Pipe is standard for underground mains for it is the only pipe that resists rust and lasts for centuries. It will serve for generations after the bonds are retired!

McWane Precalked Cast Iron Pipe lays fast and easy — with unskilled labor — no lead melting or pouring on the job. The Precalked materials are already in the bell. Just socket and calk!

KENNEDY

SAFETOP FIRE HYDRANTS

Extra large standpipes; simple, straight-line operating mechanism; smooth elbow and nozzle curves; specially long-wearing valve and gasket materials; flood-proof and frost-proof. The Patented Safety Breakable Section permits speedy, economical repairs if broken in a smashing collision.

NEWTYPE WATER GATES

Built to A.W.W.A. Specifications. All parts amply strong, with simple, positive and dependable operating mechanism. Built in sizes up to 60 in. and for manual, gear, electric motor, or hydraulic cylinder control.

Send for Bulletins

THE KENNEDY VALVE MFG. CO., Elmira, N. Y.

form the basis of the traffic problem.

In dealing with this problem, the traffic engineer has been faced with a difficult situation.

Traffic accidents are the spectacular phase of traffic engineering; yet the real causes of accidents are often deep-laid, and it is difficult to prove that a certain expensive medicine produced the cure.

The 1936 report of the Committee on Street Traffic of the American Transit Association pointed out: "The benefits of improved traffic facilities may seem intangible and the investment non-liquidating to the agency making the expenditure. A real saving accrues to both the community as a whole and its individual citizens, nevertheless, if improvements are well planned. Eventually the cost is repaid in enhanced property values, in greater consumption of taxable goods, and in the economy of properly designed and executed city planning."

Last year the Detroit Traffic Survey found that congestion and lack of terminal facilities in the central business district were reducing property values. These downtown streets carried not only vehicles bound for the district, but also thousands of other cars which passed through, crosstown arteries being inadequate. Convenient off-street parking facilities were inadequate and all curb space was occupied.

The results of these unfavorable conditions upon business were revealed when comparisons of traffic counts over a period of twelve years showed that the number of people coming into the district had actually declined although the number of passenger cars had increased. This had already been reflected in generally lower land values throughout Detroit's main shopping and business section.

The survey proposed that areas of slums and deteriorating land values surrounding the business district be utilized for terminal facilities. To encourage the use of off-street parking areas, it was proposed that a cheap shuttle-bus service be established to the shopping and office district, and that curb parking be prohibited.

The function of the traffic engineer will have increasing importance, based on the economic value of his services to the community.

197 *City Traffic Surveys*

UNDER the Civil Works Administration, the Federal Emergency Relief Administration, and the Works Progress Administration, there were approved for operation 27 state-wide traffic survey projects, 41 county-wide projects, and 197 city-wide projects.

At the close of 1937, there were in operation 21 state-wide traffic survey projects, 6 county projects, and 34 city traffic survey projects.

While not all of the projects listed as approved were actually placed in operation, the majority were, and most of them have been completed.

A. W. VON STRUVE,
Chief Periodicals Section, WPA,
Washington, D. C.

Lucite Reflectors Outline Night Highway

THESE REFLECTORS WILL MARK HIGHWAYS AT NIGHT IN A NUMBER OF STATES. THEY ARE SHOWN HERE ON ROUTE 16 BETWEEN DETROIT AND LANSING, MICH.

They are manufactured from DuPont Lucite moulding by the Stimson Reflector Co., and are assembled and sold by the Signal Service Corporation

THE use of reflectorized buttons to pick out the lettering on certain types of warning and danger signs and to spot hazards in or near the roadway such as the guard-rails on narrow bridges, has been standard practice in this and other states for some years. There has now been developed a reflector disk which gives the impression of a road with boulevard lighting, though it does not illuminate the pavement. Its primary function is to delineate the highway for about the same distance ahead of the car as the motorist sees in daylight driving.

The guides consist of three disks set in a vertical line in a metal head or container. The disks, molded from crystal-clear plastic, are lenses with a multitude of facets each having high reflecting properties. Each unit or head is mounted on a steel post at the proper height to catch and reflect the most intense part of the headlight beams. They produce points of light along the roadway which can be seen for one-half to three-quarters of a mile.

Considerable study was given to the method of installing these markers to obtain the maximum safe-driving benefits for the motorist. The replacement specifications which were adopted follow:

1.	Distance between units	100 feet
2.	Height above pavement edge	3 "
3.	Offset distance from pavement edge	
	In rural sections	8 "
	In urban sections with straight curb	4 "

An advantage of strictly adhering to the rule of uniformity in designing this installation and in resisting the temptation to use the units as danger markers, is that the way is left open for possible future development along logical lines. The present white-light units merely outline the roadway; as a result, it is possible without confusion to use units with colored disks to indicate specific and vital details of the roadway.

A special survey of motorists using this highway since the installation reveals that 97 per cent of them have reacted favorably. Although the test period so far has been comparatively brief, there is a good possibility that we shall extend their use to other highways in the state.

MURRAY D. VAN WAGONER,
State Highway Commissioner,
Lansing, Mich.

Traffic Signals as Speed Reducers

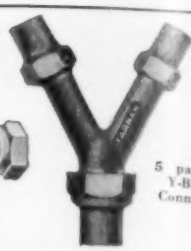
ONE OF THE SERIES OF POSTERS ON PUBLIC SAFETY ISSUED BY THE NATIONAL SAFETY COUNCIL

NEW 96-PAGE CATALOG

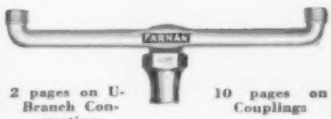
INCLUDES:

18 pages on Corporation Stops

18 pages on Curb Stops



5 pages on Y-Branch Connections



2 pages on U-Branch Connections

10 pages on Couplings

Also:

6 pages on Copper Gooseneeks
4 pages on Water Works Tools
6 pages on Extension Service Boxes
—and other *Important Material.*

THE FARNAN BRASS WORKS CO., Cleveland, Ohio

The EDDY Valve

The Eddy Valve has a number of distinctive features which it will pay you to study. For example, the gates are free to revolve on the trunnions, so as not always to seat in the same position.

Write us for further details.

Also manufacturers of the well-known Eddy Hydrant

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National Cast Iron Pipe Co., Birmingham, Ala.

You can't afford to ignore a 50 year record of Unfailing Performance

Fifty years' experience and every modern advancement combine in Kupferle Fire Hydrants.

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Send for Specification Sheets.

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ST. LOUIS

SPEED UP WORK *with* HOMELITE PORTABLES

PUMPS

2" size weighs 79 lbs.—pumps 8,000 g. p. h. 3" size weighs 91 lbs.—pumps 15,000 g. p. h. Handle muddy water or seepage easily. Completely self-priming. 28 ft. suction lift.

GENERATORS

2,500-watt size weighs 135 lbs. 1,250-watt size weighs 89 lbs. 650-watt size weighs 71 lbs. Provide dependable electricity for floodlights or electric tools. Automatic. Rugged.

BLOWERS

Deliver up to 2,000 cu. ft. of air. Weigh only 70 lbs. Air volume can be regulated. Come with canvas air duct. Need no attention after starting.

All Homelite Portables come complete with built-in gasoline engine. Write for bulletin.

See our complete advertisement in 1938 "Municipal Index"

HOMELITE CORP. 207 Riverdale Avenue Port Chester, N. Y.

IN WATER PLANTS

Raw Water Aeration
Quick Chemical Mixing
Coagulant Mixing
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Recarbonation
Filtered Water Aeration

IN SEWAGE PLANTS

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Mixing For Chemical Precipitation

"Jung Suction"
AERO-MIX
AERATOR-MIXER

A type and capacity to fit every existing or contemplated plant.

Gravity—Rotary
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Write for illustrated folder.

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Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

Zoning and Planning Notes

With the cooperation of
EDWARD M. BASSETT
Author of "Zoning" and of "The Master Plan"

Zoning Regulation—Undeveloped Area

NEW YORK.—*Arverne Bay Construction Co. v. Thatcher, Commissioner of Buildings of the Borough of Brooklyn, City of New York,* Court of Appeals, May 24, 1938, not yet reported.—This is an appeal from a decision of the Appellate Division, given in our Notes for May, 1938. The Construction Company, plaintiff, is the owner of a plot of undeveloped land in the borough of Brooklyn, until 1938 classified by the Zoning Resolution of the city as "unrestricted," when by amendment of the Resolution and Map it was placed in a residence zone. The plaintiff, claiming that its property could not be used properly or profitably for any purpose permitted in a residence zone, and that in consequence the zoning ordinance imposed upon it unnecessary hardship, applied to the Board of Standards and Appeals for a variance which would permit the use of the premises for a gasoline service station. The application was denied, and upon review in certiorari the Court sustained the Board; for the conditions which render the plaintiff's property unsuitable for residential use are general, and not confined to plaintiff's property. In such a case the general hardship should be remedied by revision of the general regulation, not by granting the special privilege of a variation to single owners (*Matter of Levy v. Board of Standards and Appeals*, 267 N. Y. 347).

Defeated in its attempt to obtain permission to put its property to a profitable use, the plaintiff has brought this action to secure an adjudication that the restrictions placed upon the use of its property by the Zoning Resolution result in a deprivation of its property without due process of law, contrary to the Constitutions of this state and the United States; and that the ordinance, in so far as it affects the plaintiff's property, is void, in this action demanding as a right what has been refused as a favor.

The defendant city challenges the right of the plaintiff to urge the invalidity of the Zoning Resolution after application for a variance made under its provisions.

At the outset, and before considering the merits of the plaintiff's cause of action, the Court disposes of the action by deciding that the plaintiff still has the right to urge the invalidity, so far as applicable to it, of the Zoning Resolution; holding that the two questions are different ones, saying:

"* * * Only two possible questions can be presented for decision upon an application for a variation: *first*, does the ordinance confer upon the administrative board power to grant the variation which is asked; *second*, if the board has power to grant it, does the exercise of a wise discretion call for its exercise in the particular case? The issue whether without such variation the strict enforcement of the general rule would work such hardship as to constitute the taking of property without due process of law is not directly presented upon an application for a variation, and it follows that the denial of the application cannot be a binding adjudication that, without such variation, enforcement of the general rule will not deprive the applicant of his property without due process of law."

And on the merits the Court reverses the Court below. It finds little room for disagreement with the general rules and tests set forth in the opinion of the lower Court (as given in our May Notes), but does disagree with their application to this case, for the following reasons:

"We are not disposed to define the police power of the state so narrowly that it would exclude reasonable restrictions placed upon the use of property in order to aid the development of new districts in accordance with plans calculated to advance the public welfare of the city in the future. We have said that 'the need for vision of the future in the governance of cities has not lessened with the years. The dweller within the gates, even more than the stranger from afar, will pay the price of blindness.' *Hesse v. Rath*, 249 N. Y. 436). We have, indeed, recognized that long-time planning for zoning purposes may be a valid exercise of the police power, but at the same time we have pointed out that the power is not unlimited. 'We are not required to say that a merely temporary restraint of beneficial enjoyment is unlawful where the interference is necessary to promote the ultimate good either of the municipality as a whole or of the immediate neighborhood. Such problems will have to be solved when they arise. If we assume that the restraint may be permitted, the interference must be not unreasonable; but on the contrary must be kept within the limits of necessity.' (*People ex rel. St. Albans-S. Corp. v. Connell*, 257 N. Y. 73.) The problem presented upon this appeal is whether or not the zoning ordinance as applied to the plaintiff's property is unreasonable. * * *

"We may assume that the zoning ordinance is the product of farsighted planning calculated to promote the general welfare of the city at some future time. If the state or the city, acting by delegation from the state, had plenary power to pass laws reasonably calculated to promote the general welfare, then the validity of the ordinance might be sustained; for 'we have nothing to do with the wisdom or good policy of municipal ordinances.' (*Euclid v. Ambler Co.*, 272 U. S. 365.) The legislative power of the state is, however, not plenary, but is limited by the Constitution of the United States and by the constitution of the state. It may not take private property without compensation even for a public purpose and to advance the general welfare. (*Matter of Eaton v. Sweeney*, 257 N. Y. 176.) 'The protection of private property in the fifth amendment presupposes that it is wanted for public use, but it provides that it shall not be taken for such use without compensation. A similar assumption is made in the decision in the fourteenth amendment. (*Harston v. Danville & Western Railway Co.*, 208 U. S. 598, 605.) When this seemingly absolute protection is found to be qualified by the police power, the natural tendency of human nature is to extend this application more and more, until at last private property disappears. But that cannot be accomplished in this way under the Constitution of the United States.' (*Pennsylvania Coal Co. v. Mahon*, 260 U. S. 393.)

"In the prevailing opinion in that case, Mr. Justice Holmes pointed out that 'the general rule at least is that, while property may be regulated to a certain extent, if regulation goes too far it will be recognized as a taking.' Whether a regulation does go too far is 'a question of degree—and therefore cannot be disposed of by general propositions,' and here Mr. Justice Holmes gave warning that 'we are in danger of forgetting that a strong public desire to improve the public condition is not enough to warrant achieving the desire by a shorter cut than the constitutional way of paying for the change.' * * *

"We have already pointed out that in the case which we are reviewing the plaintiff's land cannot at present or in the immediate future be profitably or reasonably used without violation of the restriction. An ordinance which *permanently* so restricts the use of property that it cannot be used for any purpose goes, it is plain, beyond regulation, and must be recognized as a taking of the property. The only substantial difference, in such case, between restriction and actual taking, is that the restriction leaves the owner subject to the burden of payment of taxation; while outright confiscation would relieve him of that burden.

"The situation, of course, might be quite different where it appears that within a reasonable time the property can be put to a profitable use. The temporary inconvenience or even hardship of holding unproductive property might then be compensated by ultimate benefit to the owner or, perhaps even without such compensation, the individual owners might be compelled to bear a tem-

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porary burden in order to promote the public good. We do not pass upon such problems now, for here there is no proof that within a reasonable time the property can be put to a profitable use or that the present inconvenience or hardship imposed upon the plaintiff is temporary. True, there is evidence that the neighborhood is improving and that some or all of the conditions which now render the district entirely unsuitable for residence purposes will in time be removed. Even so, it is conceded that prognostication that the district will in time become suited for residences rests upon hope and not upon certainty, and no estimate can be made of the time which must elapse before the hope becomes fact.

"During the nine years from 1928 to 1936, when concededly the property was unsuitable for any conforming use, the property was assessed at $18,000, and taxes amounting to $4,566 were levied upon it, in addition to assessments of several thousand dollars; yet, so far as appears, the district was no better suited for residence purposes at the time of the trial in 1936 than it was when the zoning ordinance was amended in 1928. In such case the ordinance is clearly more than a temporary and reasonable restriction placed upon the land to promote the general welfare. It is in substance a taking of the land prohibited by the Constitution of th United States and by the constitution of the state."

Improving Municipal Administration

Current Items from the Public Administration Clearing House

Sacramento City Employees Rate Own Worth

PUBLIC employees now rate their own efficiency on the job in Sacramento, Calif., reports the Civil Service Assembly of the United States and Canada. With approval of department heads, efficiency rating forms go first to employees, who give themselves the critical eye and put down their idea of a fair rating. Then supervisors fill in the forms, and the department head makes his final rating.

Purposes of the extraordinary system, according to the *Civil Service Assembly News Letter*, are: to bring to the attention of the employee the fact that he is being rated, and to encourage him in self-analysis; to give the superior officer opportunity to find out the kind of work the employee feels he is doing; and to give the department head the employee's viewpoint as well as the supervisor's.

Few Cities Need to Invoke Municipal Bankruptcy Act

COMPARATIVELY few cities will be forced to take advantage of the 1937 Municipal Bankruptcy Act, which was recently upheld by a decision of the United States Supreme Court, the Municipal Finance Officers' Association points out. Whereas, a few years ago, many cities would have invoked provisions of the act, today only about 3,100 local governments (including hundreds of small special districts) or 1.8 per cent of the governmental units in the United States, are listed as debt-defaulting. Most of these, however, are believed able to settle their obligations otherwise.

This was the second Supreme Court appearance of the Municipal Bankruptcy Act, which Congress passed originally in 1934 as the Sumners-Wilcox Act. Two years ago, in May, 1936, this act was held unconstitutional. The decision in the current case upon the revised act gives local governments, including special districts, the right to settle their presumably unpayable debts under authority of their states if a majority of the bondholders and the Federal District Court approve. About 20 states have laws permitting this method of debt adjustment, which is now valid until 1940.

City and other local government debt is on the down-trend in general, thanks to several factors, according to Carl H. Chatters, Executive Director of the Municipal Finance Officers' Association.

"Benefiting from their bitter experiences during the lean years of depression, municipalities in general seem to be improving the caliber of their debt administration," Mr. Chatters said. "Growing interest in cash basis operations, in planned maturity schedules, and in the use of callable bonds under certain circumstances, reflects an appreciation of the need for planning with respect to debt and to municipal finance in general. Improved reporting practices, coupled with more careful analysis on the part of dealers and investors, are producing greater discrimination between good and poor municipal credits and thus giving due recognition to sound administration."

Fireworks Control by Law

FIREWORKS control by law is meeting another test this month in Independence Day observance in the 24 states and 500 cities having a variety of fireworks regulations, the American Municipal Association points out. Administration of these laws has been difficult in the past because few states have complete and stringent regulations, while enforcement in most cities is ineffectual because of fireworks bootlegging from outside local boundaries and across state lines.

The most exacting state laws, prohibiting either sale or use of fireworks (except under licensed public supervision), are found in Iowa, New Jersey and Michigan. Kentucky and Wisconsin virtually prohibit the retail sale of fireworks, and restrictive regulations are found in Arkansas, Connecticut, Illinois, Indiana, Kansas, Louisiana, Maine, Massachusetts, Minnesota, Nebraska, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee and Vermont.

Many of the ordinances in the more than 500 cities regulating fireworks merely limit their use and sale to the period between July 1 and July 4 or thereabouts. As a variation, Albany has called into service its anti-noise ordinance as well as the ban on sale of firecrackers.

New Jersey, experiencing first use of a strengthened state law, points to its last July Fourth as a demonstration of the safety aspects of fireworks control. The state reported 72 injuries after the 1937 holiday, compared with 927 in 1936. Pennsylvania, with 2.4 times the population, had 991 fireworks injuries in 1937.

Some of the laws pointed to as most successfully enforced define carefully the variety of fireworks; sanction community displays regulated by the state fire marshal and local police and fire chiefs; specify wind conditions governing displays, and recommend fire prevention measures.

Interstate Action Advised to Aid Motorists

INTERSTATE cooperation in highway control is proposed as a solution to the heterogeneous motor laws that annoy and endanger the cross-country traveler, by Ray Ingels, Director of Motor Vehicles for California, reporting to the Council of State Governments.

"The cross-country motorist is right when he complains of the confusion among state motor-vehicle laws," said Mr. Ingels. "A New Yorker on his way to California drives through eleven states, and in only two adjoining states are speed limits the same. In eight states with fixed speed limits the differential amounts to as much as 15 miles per hour. In one there is no speed limit, and in two it is fixed as 'reasonable.'"

Headlights and spotlights present similar confusion, the report points out. In one state every motorist dims his lights within 500 feet of an approaching car. Other states have no compulsory dimming. The motorist may also be arrested for using a spotlight in some states, while in others spotlights are used indiscriminately and are a hazard.

The suggestions for interstate cooperation on motor-vehicle laws are made in a forthcoming issue of *State Government*, monthly magazine of the Council of State Governments.

Years of use LEFT IN THIS 22-YEAR-OLD STREET

THE concrete paving on West Main Street, Belleville, Ill., practically "grew up" with the automobile.

It was laid in 1915 when there were only one-tenth as many cars as today. But it was always a busy street, and now it carries in excess of six thousand vehicles daily. Yet in all its years of service, though the car tracks have been removed, the 19½-ft. concrete traffic lanes have never been closed for repairs!

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Trend Toward Reducing 23,000 Assessment Districts

ALTHOUGH assessment of property from which state and local governments annually receive about $4,500,000,000 in tax revenue is now being carried on in approximately 23,000 assessment districts, a trend toward reducing the number of these districts through consolidation is noted by a committee of the National Association of Assessing Officers.

The Association's committee on assessment organization and personnel, in the first survey ever to include a count of assessment districts, reported that Minnesota had abolished more than 70 small township districts where the assessed valuation totaled less than $50,000, while Washington eliminated 73 assessment districts last year. New York, Maine and Vermont also enlarged some districts by consolidation.

Of the 23,000 districts, however, more than 20,000 are too small to provide full-time employment for an assessor and an assistant. It was suggested that no districts be less than 10,000 population and have less than $10,000,000 assessed valuation.

Three states having no assessment districts smaller than the minimum which the committee believes necessary for economical operation are Alabama, Delaware and Ohio. A large percentage of the assessment districts in the South and Far West meet the suggested population minimum, but most eastern and midwestern states are divided into smaller units, the survey shows. Minnesota, for example, has 2,635 assessment districts, 2,601 of which have less than 10,000 population. Similar units prevail in neighboring states, Iowa having 2,548; South Dakota, 1,502; Illinois, 1,340; and Wisconsin, 1,758.

Present property assessment is made in an average of one district for each 5,345 persons, the number varying by states from one district for each 364 persons in North Dakota to one for each 97,884 in California.

29 States Now Exempt Housing Authority Property from Taxes

THROUGH a decision of the State Supreme Court, Alabama has joined the list of 28 states that grant tax exemption on properties owned by housing authorities, the National Association of Assessing Officers reported today. Only 3 of the 33 states with low-rent housing authority enabling acts now fail to permit this exemption.

To encourage private building, New York and Wisconsin several years ago gave local governments authority to exempt new dwellings if completed within a given period. New York City permits exemption on limited dividend projects erected before 1937 for a 20-year period. A third type of exemption is that by which PWA has agreed to pay a service charge in lieu of being taxed on its housing projects.

Need for Standardization in Public Welfare Jobs

WIDE differences in practice, indicating a need for better personnel procedure and clarified titles and specifications for public welfare positions, are shown in results of a public welfare job study just released by the American Public Welfare Association.

The study, made at the instance of professional schools of social work, the Social Security Board and the U. S. Children's Bureau, covered 14 states and 32 counties and certain Federal agencies.

The survey considered all kinds of public welfare positions, from case workers to supervisors and administrators. Information was gathered and analyzed on the daily tasks, qualities and qualifications of each welfare worker. From the survey the staff noted:

1. Awareness of the importance of getting qualified people for social workers, but "continued delay in putting good intentions into effect," either because of political interference or shortage of personnel with local residence.

2. Ignorance of effective methods of recruiting, selecting, and evaluating applicants for jobs.

3. Rapid development of merit systems in a number of states.

4. Advantages of better organization, community acceptance and lighter pending case loads in agencies where the staff consisted largely of persons of experience and training in social work.

The surveyors found most of the states and localities in a transition stage, suffering from inadequate integration. Public welfare staffs, also, were "generally inadequate" numerically, and in terms of training and experience, for the excessively heavy assignments. Observations during the study repeatedly revealed the importance of good organizational structure for state and local agencies; of proper administrative integration and coordination of the various programs and their services on state and local levels; constructive state supervision of local agencies; local participation in financing welfare programs; and development by local agencies of standards for personnel and service within the broad general policies prescribed by their states.

Assessors Broadcast to Taxpayers

TO citizens of Louisville, Ky., Aberdeen, S. Dak., and several other cities, assessment time means a radio chat by the local assessor on what to expect and how to cooperate when representatives of his office ring the doorbell. Assessors of these cities find this a successful way to inform taxpayers of assessing procedures and to instruct them in their own rights and duties, the National Association of Assessing Officers has reported.

Louisville Assessor John Kesselring says his city thus has increased returns and reduced arbitrary assessments. Among other cities that make use of the radio for assessment education are Atlanta, Ga., Chicago, Ill., Detroit, Mich., and Toledo, Ohio.

Recent City Manager Appointments

ELLIS J. ALLISON, State WPA District Engineer, has been appointed City Manager of Hays, Kans., effective June 15.

Tom R. Bailey has succeeded Cary S. Sheldon as City Manager of Ashtabula, Ohio. Mr. Bailey formerly held the position of City Attorney.

T. P. Clonts, former Manager of Muskogee, Okla., has been reappointed to succeed P. B. Bostic.

C. Alexander has recently been appointed City Manager of Borger, Texas.

Howard J. Charles was recently appointed Town Manager of Oakland, Maine.

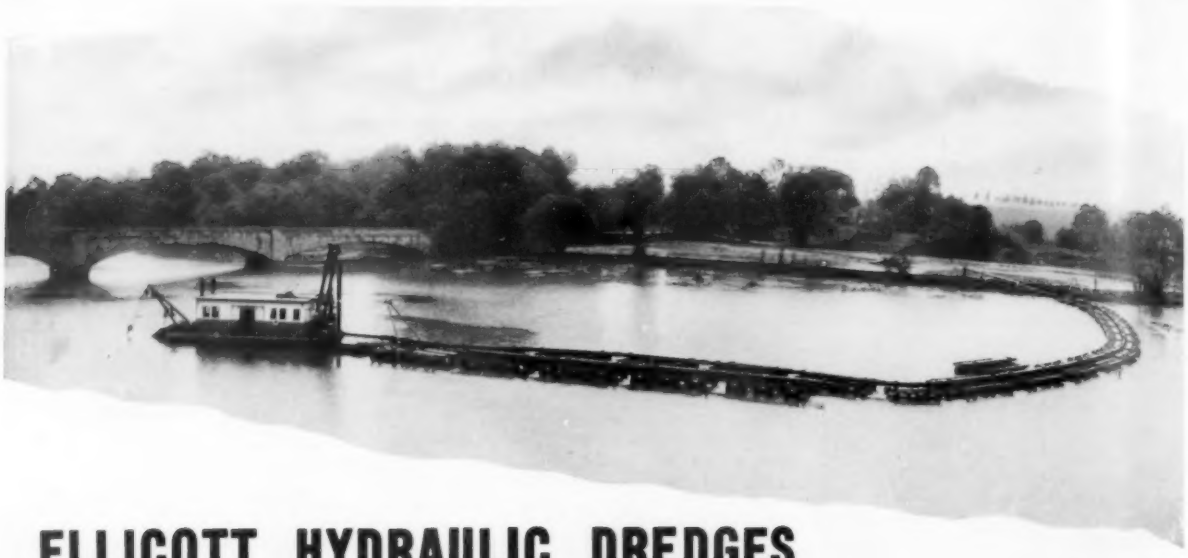
Bruce May has succeeded Milam E. Ewing as City Manager of Madill, Okla.

CLARENCE E. RIDLEY,
Executive Director, International City Managers' Association.

The Municipal Bond Market

Recent sales of new issues from the June numbers of *The Bond Buyer*:

Amount	Borrower and Purpose	Rate (%)	Term (Years)	Basis (%)
$140,000	Vernon Co., Wis., Corporate Purpose Notes	2	8.5-12 Mos. Opt.	.987
100,000	Chicopee, Mass., Macadam Pavement	1.25	1-5 Ser.	1.15
255,000	Middlesex Co., Mass., Court-House	1.25	5.33 Avg.	1.19
100,000	Niagara Falls, N. Y., Public Works	1.5	5.85 Avg.	1.47
135,000	Quincy, Mass., Fire Station	1.75	7.25 Avg.	1.70
100,000	Wyandotte Co., Kans., Relief	1.75	1-10 Ser.	1.73
125,000	Rockport, Mass., Water	1.75	9.85 Avg.	1.747
100,000	Terre Haute, Ind., Sewer Construction	2	8.33 Avg.	1.89
1,500,000	Pittsburgh, Pa.	2.25	1.25 Ser.	2.17
194,000	Osceola Co., Ia., Primary Road	2.25	6/11 O.-A	2.18
100,000	Huntington Beach, Calif., Park and Playground	2.5	1-10 Ser.	2.38
100,000	Danville, Va., Street Improvement	2.5	12.85 Avg.	2.44
200,000	Paducah, Ky., Sea-Wall Construction	3.25	13.5 Avg.	3.10
250,000	Birmingham, Ala., Capitol Improvement Funding	3.75	8.33 Avg.	3.638



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The City's Legal Rights and Duties

Conducted by A. L. H. STREET, Attorney at Law

Accidents

City held not liable for death of relief worker under ERA while working on municipal sewer project (North Carolina Supreme Court: *Barnhardt v. City of Concord*, 196 S. E. 310).

City held not liable for injury to boy whose hand was hurt when another boy closed heavy door at shower room connected with municipal swimming pool (Pennsylvania Supreme Court: *Jacob v. City of Pittsburgh*, 198 Atl. 639).

Statutory notice of personal injury claim against a city with a population of only about 1,500 held not fatally defective as failing to properly state claimant's address, where the address was given as "Girard, Illinois, near village limits," although claimant lived outside city limits, where the mayor and city attorney visited claimant after the notice was received (Illinois Appellate Court: *Fromme v. City of Girard*, 14 N. E. 2d, 690).

Actions

Water department of California city held to have waived any right to object to the venue of a suit brought against it in Nevada where the department pleaded to the merits of the claim sued on without first raising that objection (United States Circuit Court of Appeals, Ninth Circuit: *Department of Water and Power of City of Los Angeles v. Anderson*, 95 Fed. 2d, 577).

Bankruptcy Proceedings

Petition by city under new municipal bankruptcy act held properly dismissed, because based on a composition with creditors concluded before the act was adopted (United States Circuit Court of Appeals, Fifth Circuit: *In re City of West Palm Beach, Fla.*, 96 Fed. 2d, 85). Act held constitutional (United States Supreme Court: *United States v. Bekins*, 58 Sup. Ct. 811).

Municipal judgment creditors held not entitled to appointment of receiver to administer proceeds of tax levies (South Carolina Supreme Court: *Lombard Iron Works & Supply Co. v. Town of Allendale*, 196 S. E. 513).

Bond Issues

Statute authorizing city to issue bonds to buy at discount bonds of financially distressed improvement district lying within city upheld (California District Court of Appeal: *Crescent City v. Moran*, 77 Pac. 2d, 281).

Holders of special assessment bonds held not entitled to recover principal of bonds before maturity although city may have been negligent in failing to collect assessments; the bonds being general obligations of the city, and the holders' legal remedy, if any, being mandamus to require the city to perform its duty in administering the assessment funds for their benefit (United States District Court, Eastern District of Pennsylvania: *Bessemer Investment Co. v. City of Chester*, 22 Fed. Supp. 311).

Business Regulations

Ordinance forbidding solicitation of orders for goods on residential premises without occupant's request or invitation held void, especially as to occupants not indicating by sign or otherwise that solicitation is not allowed (Florida Supreme Court: *Prior v. White*, 180 So. 347).

Comfort Stations

City held properly enjoined, at instance of nearby property owner, against constructing a comfort station above ground in a parkway (California Supreme Court: *Hassell v. City and County of San Francisco*, 78 Pac. 2d, 1021).

Contracts

Contract by town board to hire operator of town water pump for life held not binding beyond the term of the officers who made the contract (Mississippi Supreme Court: *Tullos v. Town of Magee*, 179 So. 557).

Albany Port District held a municipality within statute conferring lien rights on those furnishing materials under construction contracts with "municipal corporations" (New York Supreme Court, Appellate Division: 2 N. Y. Supp, 2d, 666).

Debt Limits

In suit against town on notes, answer pleading that they exceeded debt limit held required to particularize facts concerning the municipal indebtedness (Alabama Supreme Court: *First National Bank v. Town of Luverne*, 180 So. 283).

Licenses

Coal dealer who bought and sold used building materials held not subject to license ordinance covering "junk dealers" (Pennsylvania Court of Common Pleas, Allegheny County: *Commonwealth v. Paul*, 29 Pa. Munic. Law Rep., 159).

Power to regulate "garages" held to permit licensing of parking lots (Illinois Supreme Court: *City of Chicago v. Ben Alpert, Inc.*, 13 N. E. 2d, 987).

Municipal Offices

Petition for referendum election held properly filed with mayor of village at his home where he transacted some municipal business there and had no regular office hours elsewhere (Ohio Supreme Court: *State v. Council of Village of Milan*, 14 N. E. 2d, 772).

Municipal Organization

Statute purporting to give non-resident freeholders the right to vote and hold office in incorporated "resort communities" held unconstitutional (South Carolina Supreme Court: *Thomas v. Macklen*, 195 S. E. 539).

Municipal Territory

Legislature held empowered to annex to or detach from municipal territory, with or without the consent of the municipal authorities (Illinois Supreme Court: *Geweke v. Village of Niles*, 14 N. E. 2d, 482).

Municipal Utilities

Consumer who accepted water on meter basis held liable for reasonable charge on that basis although other consumers similarly situated were furnished water at a lower flat rate (Mississippi Supreme Court: *Almaras v. City of Hattiesburg*, 180 So. 392).

Official Newspapers

Newspaper held qualified to act as official municipal journal as being "published" in town, where it was entered in the post office and whence it was distributed, although printed elsewhere (Louisiana Court of Appeal: *Bardwell v. Town of Clinton*, 180 So. 148).

Official Tenure

Under statute held that aldermen who appointed recorder for two-year term could remove him at will (Texas Court of Civil Appeals: *Ratliff v. City of Wichita Falls*, 115 S. W. 2d, 1153). To same general effect, under statute fixing city clerk's tenure at three years if he shall so long behave himself well, see decision of Pennsylvania Supreme Court in *Commonwealth v. Lindsay*, 198 Atl. 635.

Playgrounds

Municipal playgrounds held properly established under statutory authority to organize park districts (Illinois Supreme Court: *Decatur Park District v. Becker*, 14 N. E. 2d, 490).

Public Utilities

Water company held not entitled to enjoin city from proceeding toward acquisition of rival plant on ground that city was attempting to coerce company to sell at inadequate price and that a prospective grant of Federal aid to city would be unlawful (United States District Court, Northern District of California: *California Water Service Co. v. City of Redding*, 22 Fed. Supp. 641).

Riots

City held without standing to question constitutionality of statute making cities liable for property losses exceeding $50 in riots, on ground that act discriminates against owners of property damaged less than $50 (Rhode Island Supreme Court: *Goldman v. Quinn*, 198 Atl. 549).

Salaries

Civil service employee held not entitled to pay for time that he was improperly laid off, where he did not diligently apply for reinstatement and the salary was paid to the employee who took his place (Oregon Supreme Court: *Mitchell v. City of Portland*, 78 Pac. 2d, 582).

State Control

Under statute, state tax collector held empowered to sue on behalf of city to recover rentals due city under contract (Mississippi Supreme Court: *Gully v. Williams Bros.*, 180 So. 400).

Taxation

Real estate tax assessment of business property in city held not invalid because made under a system whereby ground values were measured in percentages of frontage value of key property in each district (Iowa Supreme Court: *Trustees of Flynn's Estate v. Board of Review*, 278 N. W. 342).

Suit by city to recover from county tax collections belonging to city held not barred by delay in suing (Arizona Supreme Court: *City of Bisbee v. Cochise County*, 78 Pac. 2d, 982).

Tax levy for general fund held void where there was ample surplus in the fund and revenue from other sources sufficed for approved needs (Oklahoma Supreme Court: *Protest of St. Louis-San Francisco Railway Co.*, 78 Pac. 2d, 806).

Tourist Camps

Ordinance regulating tourist camps, by limiting stay of patrons and imposing regulations designed to promote the health and safety of patrons, etc., upheld (Indiana Supreme Court: *Spitler v. Town of Munster*, 14 N. E. 2d, 579).

Traffic Regulations

Home-rule city ordinance duplicating statutory regulation of maximum loads and truck weights upheld (Texas Court of Civil Appeals: *Yellow Cab Transit Co. v. Tuck*, 115 S. W. 2d, 455).

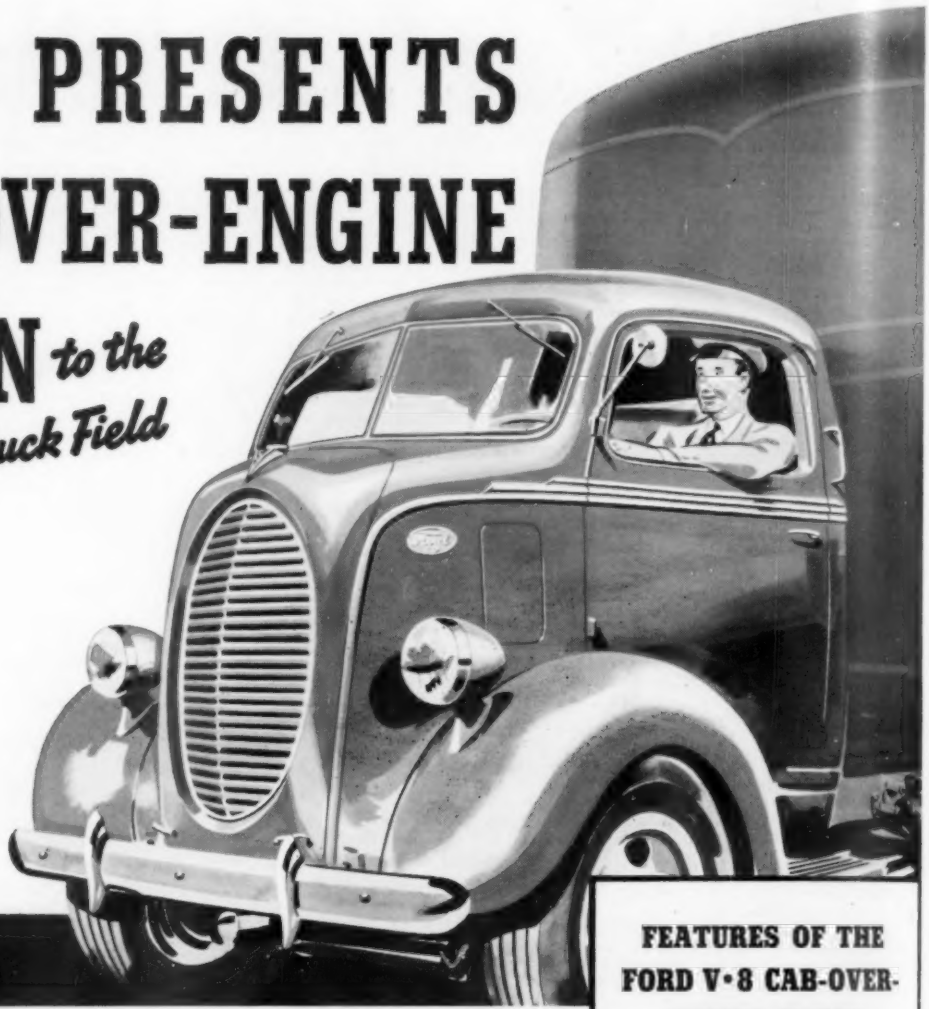
Judgment convicting an automobile driver of speeding and suspending his driver's license held stayed by his appeal, making illegal his subsequent arrest on a charge of driving a car while the license was suspended (St. Louis, Mo., Court of Appeals, *Schwaller v. May*, 115 S. W., 2d, 207).

Ordinance for compulsory inspection of motor vehicles held proper exercise of police power (Ohio Supreme Court: *Mayer v. Ames*, 14 N. E. 2d, 617).

Water Supply

Suit for damages for flooding of land by dam constructed by city across a creek held brought in due time (Oklahoma Supreme Court: *Herwig v. City of Guthrie*, 78 Pac. 2d, 793).

FORD PRESENTS CAB-OVER-ENGINE DESIGN *to the Low-priced Truck Field*



FOR YEARS truck owners and operators have asked for a low-priced cab-over-engine unit. Ford now answers this demand. The Ford V-8 Cab-Over-Engine is here.

The Ford V-8 Cab-Over-Engine is of advanced design, yet it utilizes time-and-service-proved features of Ford construction. Every detail has been planned to take the greatest advantage of a short wheelbase to provide increased payload space.

But most important of all features to be found in these new units is Ford Economy. Owners and operators everywhere report that the Ford Truck does more work, in less time, at lower cost. The reason—because Ford has found the way to make extra cylinders mean extra economy as well as finer performance.

Examine the Ford V-8 Cab-Over-Engine Truck at your Ford dealer's today. Then arrange for an "on-the-job" test with your own driver and your own loads over your own routes. No cost.

FEATURES OF THE FORD V·8 CAB-OVER-ENGINE TRUCK

- ★ 101-inch and 134-inch wheelbases.
- ★ 85-horsepower eight-cylinder engine.
- ★ Advanced design. Service-proved top-quality Ford engineering features.
- ★ Easy entrance to cab, wide door hinged at front.
- ★ Comfortable riding.
- ★ Easy steering.
- ★ Easy accessibility to engine.
- ★ Designed for convenient servicing.
- ★ Greater maneuverability in traffic.
- ★ Greatly increased payload space.
- ★ Increased view of road.
- ★ Decreased turning radius.
- ★ Time-and-money-saving Ford Engine and Parts Exchange Plan.

FORD V·8 TRUCKS

MORE WORK IN LESS TIME AT LOWER COST ACCORDING TO OWNERS' RECORDS

Municipal and Civic Publications

Prices quoted do not include postage, unless so stated

Construction

Roads, Canals and Embankments with Caterpillar Equipment.—Published by Caterpillar Tractor Co., Peoria, Ill. 1938. 182 *pp. Illustrated.* 50c.

This book was written by F. A. Nikirk, a civil engineer who had long experience in the design and construction of engineering projects before joining the Caterpillar Tractor Co. in 1927. Since then his time has been given to the study of equipment uses, the adaptability of equipment to field requirements, and the output of work that may be expected from various units. This book presents some of the more common uses of Caterpillar track-type tractors and road machinery in combination with allied equipment designed for use with these tractors. Originally printed in a very limited edition, copies of this book are now available to city engineers and others wishing to secure a fairly thorough guide of road-building methods and equipment.

Cost of Government

Cost of Government in the United States, 1935-1937.—*National Industrial Conference Board, 247 Park Ave., New York.* 1938. $3.50. *xv* + 163 *pp.*

Federal expenditures have reached a high level over the past few years through the acceptance of the theory that expenditures in excess of revenues will stimulate business activity. The total expenditures of all governments in the United States amounted to $17,147,000,000 for the fiscal year 1936, and of the Federal Government alone, $8,576,000,000. This is the largest total ever reached. Combined tax collections for all governments amounted to $10,498,000,000 in 1936, and for the Federal Government, $3,847,000,000. These also are record figures. On June 30, 1937, the gross debt of all governmental units amounted to $55.6 billion, and of the Federal Government, $36.4 billion. These figures are broken down, amplified, and compared with other figures in the above-named study, accompanied by considerable analysis and discussion. Special attention is given in this volume to the effect of social security financing upon Federal fiscal policies.

Swimming Pools

The modern swimming pool is no longer looked upon as a medium for disease transmission if built and operated under the proper standards. "Swimming Pools and Other Public Bathing Places" is a recent publication containing the "Report of the Joint Committee on Bathing Places, American Public Health Association and Conference of State Sanitary Engineers" and a summary of State Health Department regulations for swimming pools, and extracts from the U. S. Treasury Department standards for drinking water. Chlorination is recognized here as the most economical and satisfactory method of disinfecting swimming pool water. 51 pp. Free on request. (Apply to Wallace & Tiernan Co., Inc., Newark, N. J.)

Training for Public Service

Over the past few years there has been a growing interest in the field of training for the public-service occupations. An outgrowth of this interest was the passage of the George-Deen Act by the 74th Congress containing a provision making Federal aid available to the states for the promotion of training in the public service. A pamphlet recently published by the U. S. Department of the Interior, Office of Education, entitled "Training for the Public-Service Occupations 1937," reviews what has been done to date in the line of training for public-service occupations, interprets the provisions of the George-Deen Act relevant to the promotion of that type of vocational education, sets up a tested procedure for planning and developing training programs, and shows how the services of Federal, state and local trade and industrial education agencies may be enlisted in these programs. 90 pp. 20c. (Apply to the Supt. of Documents, Washington, D. C.)

City Planning: Housing

City Planning: Housing, Volume III, A Graphic Review of Civic Art, 1922-1937.—*By Werner Hegemann, edited by William W. Forster and Robert C Weinberg. Architectural Book Publishing Co., Inc., New York.* 1938. *vi* + 162 *pp.*, 12 *by* 16 inches. $13.75 *from* THE AMERICAN CITY.

This imposing volume contains a collection of plans and photographs of some of the world's finest achievements in city planning. Examples of most of the elements of a modern city are given, with particular emphasis on communication, recreation, and public housing, each of which has a special section devoted to it. The remaining sections include one on planning in general, one on types of large-scale housing, and one containing some technical data for planners. This volume is not only beautiful and fascinating to look at by lay and professional people, but should be of real value to architects, engineers and planners as a reference book on the significant developments in their fields. To the city official it should be valuable as a guide to some of the best-known methods of solving many of the problems besetting him in his own city.

The Geography of Reading

The Geography of Reading.—By Louis R. Wilson. Published by the American Library Association and the University of Chicago Press, Chicago, Ill. 1938. *xxi* + 481 *pp.* $4.00 *from* THE AMERICAN CITY.

Cultural and educational opportunities are by no means evenly spread over this great country. Libraries and library resources are easily available to some, and inaccessible to others, according to the results of an extensive survey reported in this volume. Accompanied by many maps and tables, "The Geography of Reading" describes in considerable detail the distribution of libraries and other facilities for education and communication, analyzes the reasons for the unevenness in the development of libraries, and offers suggestions for increasing the quantity and the use of library resources.

Libraries

Who Uses the Public Library.—By William Converse Haygood. University of Chicago Press, Chicago, Ill. 1938. *xix* + 137 *pp.* $2.00 *from* THE AMERICAN CITY.

The New York Public Library has paused for self-evaluation. This study examines the patrons of the library in the two years of 1934 and 1936 with an eye to who they were, what they wanted, whether or not they found the information requested, and if so, how. On the basis of such facts the librarians can check their theories in their application to the problems of the reading public and make any changes that may seem advisable to improve their service.

Control of Printed Matter

The American Municipal Association has published a report on the recent Griffin, Ga., handbill case, in which the Griffin city ordinance prohibiting the distribution of handbills and other literature was voided by the United States Supreme Court. The case has attracted attention because of its application to the present much-discussed subject of restrictions on the freedom of the press. It has also been of particular interest to municipal officials, who in many cases have misinterpreted the decision to mean that all local regulations adopted on the subject of the distribution of printed matter in any form whatsoever are invalidated. This pamphlet, "Handbills: Freedom of the Press and the Griffin Case," discusses and analyzes decisions in other legal cases which support the right of cities to place limited restrictions on promiscuous distribution of handbills and printed matter which interfere with the "morals, peace, safety and general welfare of a community"; and shows why they are not inconsistent with the decision in the Griffin case. (Apply to the American Municipal Assn., 1313 E. 60th St., Chicago, Ill.)

Social Welfare Laws

Social Welfare Laws of the 48 States.—Compiled by Wendell Huston. Published by Wendell Huston Co., Seattle, Wash. Third edition, 1937. $12.50 *from* THE AMERICAN CITY.

There has been so much social welfare legislation over the past four years that a revision of this book became necessary. In its present form it contains a section for each state, each with its own index and the laws arranged by subject matter. In addition to laws of public relief of one kind or another, this collection includes labor laws, strike laws, the tax systems set up to finance permanent and emergency relief, and the taxes which are a part of the state social security programs under the Federal Social Security Act. A special section is devoted to the Federal Social Security Act. This valuable reference work on social legislation is bound in loose-leaf form so that supplements may easily be incorporated.

The Right to Work

The Right to Work.—By Nels Anderson, Director, Section on Labor Relations, WPA. Modern Age Books, Inc., New York. 1938. 152 *pp.* 50c.

Mr. Anderson feels strongly the necessity of lessening the costly burden of idleness by more public employment when and where it is needed. This is one of the most challenging issues before the public today. "The Right to Work" discusses public work in relation to the problem of unemployment, describing its essential elements and characteristics as they appear from that particular angle. The author's experience with the WPA is largely drawn upon, and the operation of the Federal program to this date is described.

Measuring Municipal Activities

"Measuring Municipal Activities," by Clarence E. Ridley and Herbert A. Simon, is subtitled "A Survey of Suggested Criteria and Reporting Forms for Appraising Administration." It contains two chapters on measurement technique in general and the development of measurement techniques, and then discusses the means of measuring the administrative results of 11 chief activities of local government: fire; police; public works; health; recreation; welfare; education; libraries; personnel; finance; and planning. In two appendices, A and B, there is to be found a bibliography and 29 suggested monthly report forms for reporting the data essential to measurement. 102 pp. $2.00. (Apply to the International City Managers' Assn., 1313 E. 60th St., Chicago, Ill.)

Municipal Accounting

The proceedings of the Conference on Municipal Accounting and Finance of the American Institute of Accountants which was held on March 28 and 29, 1938, have been published in "Addresses Presented at the Conference." The papers deal with basic principles as well as practical accounting methods. 85 pp. $1.00. A supplement entitled "Accounting Controls in the Federal Government," by E. F. Bartelt, is available with the rest of the proceedings. 15 pp. (Apply to the American Institute of Accountants, 135 Cedar St., New York.)

The Tennessee Valley

The Tennessee Valley Authority has compiled and published through its Department of Regional Planning Studies a scenic inventory, entitled "The Scenic Resources of the Tennessee Valley." The scenery and the potential recreational opportunities of the Tennessee Valley Region are as real an asset as its many other natural resources, and their wise conservation and economic development is important socially and economically to both region and nation. The first step in preparing for its proper use is to measure the extent, quality and value of this resource—the purpose of this collection of descriptive material, maps and photographs of the outstanding features of the region. 234 pp. $1.00. (Apply to the Tennessee Valley Authority, Knoxville, Tenn.)

LOOK FOR THE *Facts*

You who purchase motorcycles for police use have a great responsibility. You must select machines which will give most dependable service at lowest operating and maintenance costs. You must consider a motorcycle's speed, stamina, safety, ease of operation as adding to the efficiency of your police officers — and to building up your enforcement record . . . Equally important to you is the long experience, quality of workmanship, and established reputation of the company which designs and builds the motorcycles you buy. Therefore, it is not how much you *pay* for a motorcycle, but how much you *get out of it* which counts. Before you buy any motorcycle be sure it has the features listed below which assure years of matchless performance.

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Double strength, heat treated fork with dual action cushion and recoil springs
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Airplane dial speedometer
Economical, circulating pressure oiling system
Easy-acting dry plate clutch
Adjustable ride control
Constant mesh transmission
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Standard Plumbing Details

Standard Plumbing Details.—By Louis J. Day, Architect, Member of the American Society of Sanitary Engineering, Instructor, Mechanical Institute. John Wiley & Sons, Inc., New York. 1938. 119 *drawings.* $6.00 *from* THE AMERICAN CITY.

This large collection of diagrams and scale-drawings illustrates the plumbing connections required in building construction and the details of how they fit together. Its main purpose is to indicate the necessary space requirements for plumbing installation, since confusion on this subject in the past by architects and others has caused needless trouble and expense. The plates are drawn to be as generally applicable as possible, but it will of course be necessary to ascertain more accurate measurements in each specific installation.

Community Planning

In a brief report prepared by Albert S. Bard and published by The City Club of New York entitled "The Next Step in Community Planning," the following amendment to the New York State Constitution is proposed:

Planning and Conservation:

The natural beauty, historic associations, sightliness and physical good order of the state and its parts contribute to the general welfare and shall be conserved and developed as part of the patrimony of the people, and to that end private property shall be subject to reasonable regulation and control.

The remainder of the pamphlet analyzes the existing attitude toward private property owners' rights and discusses the possibilities of, and the actual steps taken in various areas toward modification of, these rights in the interest of community planning and design. 9 pp. Free on request. (Apply to The City Club of New York, 55 W. 44th St., New York.)

The Hudson River Basin

The third bulletin in a series entitled "A Preliminary Survey of Water Resources in New York State" deals with the Hudson River. In it such problems as potable water supply, water power, navigation, recreation, flood control and pollution abatement are discussed with reference to the Hudson River Basin in its three sections—the Upper Hudson, the Mohawk, and the Lower Hudson. Certain of the problems are appraised in the light of what future water resources studies are needed for purposes of control and coordination. 72 pp.; 21 plates. (Apply to the Division of State Planning, Albany, N. Y.)

Venereal Disease Legislation

As a guide to the many cities that are now attempting to establish an effective legal basis for venereal disease control, the United States Conference of Mayors has published a report entitled "Principles Included in Venereal Disease Legislation in New York City and New York State and Text of the Law." The New York legislation is reputed to contain all the essential principles which go to make up a good venereal disease control law. 7 pp. (Apply to the United States Conference of Mayors, 730 Jackson Place, Washington, D. C.)

Fire Protection

The National Board of Fire Underwriters has recently published a list of its publications. Material has been issued on fire-extinguishing appliances, fire-extinguishing auxiliaries, flammable liquids, combustible solids, hazardous gases, explosive dust, electrical equipment, construction, and some miscellaneous subjects, covering regulations, recommended safeguards and good practise requirements. (Apply to the National Board of Fire Underwriters, 85 John St., New York.)

Highway Engineering

"The Proceedings of the Seventeenth Annual Meeting of the Highway Research Board" contains a larger number of technical articles than any previous issue. The papers are grouped under the headings of Finance, Highway Transportation Economics, Design, Materials and Construction, Maintenance, Traffic and Safety, and Soils Investigations. This volume should be of considerable value to highway engineers. $2.25. (Apply to the Highway Research Board, 2101 Constitution Ave., Washington, D. C.)

Social Agency Boards

Social Agency Boards—And How to Make Them Effective.—By Clarence King. Harper & Brothers, New York. 1938. 88 *pp.* $1.25 *from* THE AMERICAN CITY.

There have been numerous pamphlets and books written about boards of particular types of social agencies, but this is the first book to deal with volunteer citizen boards for all types of social agencies, public or private. It will be of interest to social agency executives and board members in defining the fundamental philosophy of the board, its purpose, functions, organizations. Suggestions are made for reconciling the differences which often arise between the board as a non-technical citizen group representing and interpreting the community, and the executive as an expert trained in his field. There is an interesting chapter outlining the means by which a board member may prepare himself for effective and efficient service; and another giving suggestions for the conduct of board meetings.

The book is stimulating and thought-provoking; brief and easily read. Because the theory of the citizen board is based on a fundamental philosophy of democracy, and because of the implications of the board as an element in the democratic process, this study of its role in the community life has particular present-day significance.

San Francisco's Recent Story

A 64-page brochure entitled "San Francisco's Six Years of Achievement,"—six years of government under the new charter and Mayor Angelo J. Rossi. Possibly some of this achievement, at least an incentive to achieve, resides in the fact that in the 46.5 square miles that are San Francisco the 700,000 citizens live under only one local government.

The municipality has numerous modern features, including 1,300 voting machines. The Municipal Railway is part of a $165,000,000 publicly owned utility system under one commission which has reduced water rates three times and maintained the 5-cent street-car fare without subsidy. The youngest utility is the airport, with traffic up 500 per cent in three years. Modern accounting and billing machines are used, and delinquent revenues increased $100,000 the first year of the new charter, and since then have amounted to $500,000 per year. The city's many public activities are described and finely illustrated. (Apply to The Recorder Printing and Publishing Co., 99 S. Van Ness Ave., San Francisco, Calif.)

State Planning Board Programs

In a bulletin entitled "Current Programs of Work, State Planning Boards," the National Resources Committee has assembled from the various state planning boards of the country, statements of their current programs likely to be completed by the end of 1938. The material is outlined in easily readable form according to states, with a "summary tabulation" included, showing distribution of subjects being studied in the various states. Among others, these studies include those of land, water, minerals, power, conservation, population, transportation, public works, economics and industry, education, recreation, health and welfare, housing, government and finance, local planning, mapping. The bulletin should prove suggestive to other planning agencies and Federal bureaus concerned. (Apply to National Resources Committee, North Interior Bldg., Washington, D. C.)

Community Planning

For those citizens who are beginning to be aware of the critical condition of our cities stemming from the many physical, economic and social changes that are occurring within them, the Regional Plan Association has published "Community Planning, a Manual of Practical Suggestions for Citizen Participation," by Wayne D. Heydecker and W. Phillip Shatts. Often where there is recognition of city planning problems, there is little conception of how to meet them. The pamphlet offers suggestions on how to organize for local planning, how to determine exactly what improvements are needed, and how to obtain those improvements. It has already been widely used and the practicability of the plan demonstrated, this being the fourth edition of the manual by popular demand. 38 pp. 25c. (Apply to the Regional Plan Association, Inc., 400 Madison Ave., New York.)

Metropolis

Metropolis, A Study of Urban Communities.—By Howard B. Woolston, Ph.D. D. Appleton Century Co., New York. 1938. *xii* + 325 *pp.* $2.75 *from* THE AMERICAN CITY.

This volume is an account of American city life over the past 50 years, with some reference to cities in other parts of the world. It is essentially a sociological interpretation, a study of human beings as they live in groups in urban communities. The city has many effects on its inhabitants which make them different from their country cousins, and the forces inducing these special attitudes and modes of conduct are herein analyzed. Some of them are constructive, some destructive, but they are all a part of contemporary urban development. This volume has been especially designed as a textbook for university and college courses in urban sociology.

State Planning

"The Future of State Planning" is a recent publication of the National Resources Committee outlining the future possibilities of state planning and methods for approaching the realization of these possibilities. It is through state planning agencies that the activities of all other planning agencies can be most effectively harmonized. Planning on a national scale can best be carried out through the cooperation of state planning boards, which are in a position to interpret local as well as state needs to the Federal Government and vice versa. The report recommends that the Federal Government continue to stimulate and aid state, interstate and regional planning and seek the establishment of active state planning boards. For this purpose a permanent national planning agency should be established, ready to assign technical and advisory assistance to these boards. 117 pp. 25c. (Apply to the Supt. of Documents, Washington, D. C.)

Liquor Revenues

The third annual pamphlet on "Public Revenues from Alcoholic Beverages" published by the Distilled Spirits Institute shows larger aggregate revenues from the various imposts and fees in 1937 than in previous years. This is attributable to a small increase in consumption, to the imposition of new taxes, and to the higher rates of established taxes. The uses to which these revenues are applied are described in this report, and the temptation to meet enlarged public expenditures through boosting levies on alcoholic beverages is noted. The Distilled Spirits Institute, which is particularly interested in controlling bootlegging, feels that the present level of taxes on liquor are high enough to stimulate tax-law evasion and that further increases in these taxes would aggravate this condition. 57 pp. (Apply to the Distilled Spirits Institute, Inc., National Press Bldg., Washington, D. C.)

Other Reports Received

APPLETON, WIS.—Annual Report, Chamber of Commerce, year ending March 31, 1938. 13 pp.

BALTIMORE, MD.—"Mayor's Committee on Recreation, Recommendations and Summary of Study." 32 pp.

DISTRICT OF COLUMBIA.—"The Public Child Welfare Program in the District of Columbia." Children's Bureau, U. S. Dept. of Labor, Washington, D. C. 82 pp.

GARDEN CITY, N. Y.—Annual Report, 1938. 26 pp.

HOLLAND, MICH.—Annual Report, Board of Public Works, 1937. 61 pp.

ILLINOIS.—Illinois State Housing Board Report for 1937. 24 pp.

JERSEY CITY, N. J.—Annual Report, City Comptroller, 1937.

MULTNOMAH COUNTY (PORTLAND), ORE.—"Budget Facts and Financial Statistics, 1938." 81 pp.

MILWAUKEE COUNTY, WIS.—"Financial Summary, 1937." 132 pp.

MINNEAPOLIS, MINN.—Annual Report, Fire Department, 1937. 52 pp.

SEATTLE, WASH.—Annual Report, Department of Lighting, 1937. 107 pp.

UNITED STATES.—"General Relief Statistics, January, 1936, through March, 1937." Works Progress Administration, Washington, D. C. 57 pp.

SALVAGE

—for taxpayers, a "BONUS"; for labor, a "BREAK"

Brick pavements have an exclusive advantage of a broad economic nature. After long service, the brick units have high salvage value.

Salvaging and relaying old brick on their new base is rarely ever an emergency* matter from the traffic standpoint. And this flexibility as to *time* when the work may be done permits postponement from periods when labor is scarce to times when men need employment.

Thus, relaying does not compete with private employment in good times; it furnishes a backlog of needed hand-labor when labor must have employment.

In recent years the Works Progress Administration has utilized this work with splendid results. Salvage of 40-year brick has often run over 75%. Engineer Fred T. Williams reports 116% salvage at Sanford, Fla., where "on edge" brick were turned flatwise in the new pavement. WPA forces turned out a good job which should equal the service the 36-year brick had already rendered.

New or relaid, brick has the longest life and lowest upkeep. Safe. Pleasant to ride on. And the big salvage is a "bonus" to taxpayers and a "break" for labor. National Paving Brick Association, National Press Bldg., Washington, D. C.

*The Reason: At any stage of service, brick resists damage from weather as well as traffic.

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LONGEST LIFE . . . LOWEST UPKEEP . . . GREATEST SALVAGE VALUE

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Conventions -- When and Where

(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)

Meeting is annual convention unless otherwise designated

JULY 13-15.—ATLANTA, GA.
Georgia Municipal Association. (Ansley Hotel.) Sec., Zach Arnold, Ansley Hotel, Atlanta, Ga.

JULY 20-23.—SALT LAKE CITY, UTAH.
American Society of Civil Engineers. (Hotel Utah.) Sec., George T. Seabury, 33 W. 39th St., New York.

JULY 25-28.—ALLENTOWN, PA.
Pennsylvania Chiefs of Police Association. Sec., F. B. Titus, Lansdowne, Pa.

JULY 26-28.—SARANAC LAKE, N. Y.
New York State Association of Chiefs of Police. (Hotel Saranac.) Sec.-Treas., R. W. Morris, P. O. Box 346, Geneva, N. Y.

AUGUST 1-4.—DETROIT, MICH.
Michigan Association of Chiefs of Police. (Detroit Leland Hotel.) Sec.-Treas., J. P. Hackett, Birmingham, Mich.

AUGUST 5-6.—ASHEVILLE, N. C.
North Carolina League of Municipalities. Exec. Sec., Patrick Healy, Jr., Capital Club Bldg., Raleigh, N. C.

AUGUST 9-12.—PORTLAND, ORE.
American Institute of Electrical Engineers. (Multnomah Hotel.) Nat'l Sec., H. H. Henline, 33 W. 39th St., New York.

AUGUST 9-11.—MASON CITY, IOWA.
League of Iowa Municipalities. (Hanford Hotel.) Sec.-Treas., Frank G. Pierce, Marshalltown, Iowa.

AUGUST 13-20.—MEXICO CITY.
International Federation for Housing and Town Planning. Congress. Gen. Sec., Donald C. L. Murray, rue Cantersteen 47, Shell Bldg., 608, Brussels, Belgium. Mexican rep., Carlos Contreras, Ramos Arizpe No. 1, Mexico, D. F.

AUGUST 14-20.—EVANSTON, ILL.
National Institute for Commercial and Trade Organization Executives. (Northwestern Univ.) Sec., C. R. Miles, 836 First National Bank Bldg., Chicago, Ill.

AUGUST 15-18.—ST. PAUL, MINN.
Municipal Finance Officers' Association of the United States and Canada. (Hotel Lowry.) Exec. Dir., Carl H. Chatters, 1313 E. 60th St., Chicago, Ill.

AUGUST 17-19.—WHEELING, W. VA.
American Water Works Association—Central States. (Hotel Windsor.) Sec., E. P. Johnson, 418 Flannery Bldg., Station 13, Pittsburgh, Pa.

AUGUST 18-19.—ANNISTON, ALA.
Alabama League of Municipalities. (Alabama Hotel.) Exec. Sec., E. E. Reid, Montgomery, Ala.

AUGUST 25-26.—LEXINGTON, VA.
American Water Works Association—Virginia Section. (Hotel Robert E. Lee.) Sec., H. W. Snidow, 601 State Office Bldg., Richmond, Va.

AUGUST 29-SEPTEMBER 1.—MINNEAPOLIS, MINN.
Illuminating Engineering Society. (Nicollet Hotel.) Gen. Sec., A. D. Cameron, 51 Madison Ave., New York.

AUGUST 29-SEPTEMBER 3.—ATLANTA, GA.
International Association of Fire Fighters. (Atlanta Biltmore Hotel.) Sec.-Treas., George J. Richardson, A. F. of L. Bldg., Washington, D. C.

AUGUST 31-SEPTEMBER 2.—READING, PA.
League of Cities of the Third Class in Pennsylvania. (Berkshire Hotel.) Sec., Herman A. Early, City Hall, Harrisburg, Pa.

AUGUST 31-SEPTEMBER 2.—ST. LOUIS, MO.
National Shade Tree Conference. (Coronado Hotel.) Sec.-Treas., L. C. Chadwick, Ohio State Univ., Columbus, Ohio.

SEPTEMBER 5-8.—TORONTO, ONT.
International Association of Chiefs of Police. (Royal York Hotel.) Exec. Vice-Pres., William P. Rutledge, 1313 E. 60th St., Chicago, Ill.

SEPTEMBER 6-9.—SANTA BARBARA, CALIF.
League of California Municipalities. Sec., Richard Graves, 223 City Hall, San Francisco, Calif.

SEPTEMBER 8-10.—VALLEY CITY, N. DAK.
League of North Dakota Municipalities. (Rudolph Hotel.) Exec. Sec., Myron H. Atkinson, City Auditor, Bismarck, N. Dak.

SEPTEMBER 8.—LEBANON, PA.
Pennsylvania Water Works Operators' Association. Sec.-Treas., I. M. Glace, 22 S. 22d St., Harrisburg, Pa.

SEPTEMBER 12-13.—CASPER, WYO.
American Water Works Association—Rocky Mountain Section. (Townsend Hotel.) Sec.-Treas., B. V. Howe, State Office Bldg., Denver, Colo.

SEPTEMBER 12-15.—BALTIMORE, MD.
International Municipal Signal Association, Inc. (Lord Baltimore Hotel.) Sec., Irvin Shulsinger, 7 E. 42d St., New York.

SEPTEMBER 12-13.—HOT SPRINGS, VA.
League of Virginia Municipalities. (Homestead Hotel.) Exec. Sec., Morton L. Wallerstein, 902 Travelers Bldg., Richmond, Va.

SEPTEMBER 12-16.—LOS ANGELES, CALIF.
Western Safety Conference. (Ambassador Hotel.) Gen. Chmn., Gerry H. Lockner, Los Angeles, Calif.

SEPTEMBER 13-16.—BOSTON, MASS.
New England Water Works Association. (Hotel Statler.) Sec., Frank J. Gifford, 613 Statler Bldg., Boston, Mass.

SEPTEMBER 14-16.—SAGINAW, MICH.
American Water Works Association—Michigan Section. (Bancroft Hotel.) Sec., M. N. Gerardy, Water Board Bldg., Detroit, Mich.

SEPTEMBER 14-15.—ROCKFORD, ILL.
Illinois Municipal League. (Hotel Faust.) Sec., A. D. McLarty, 500 E. Capitol Ave., Springfield, Ill.

SEPTEMBER 18-22.—MILWAUKEE, WIS.
American Institute of Park Executives. Exec. Sec., Will O. Doolittle, Box 422, Tulsa, Okla.

SEPTEMBER 19-20.—WATERTOWN, S. DAK. (TENTATIVE.)
South Dakota Water and Sewage Works Conference. Sec., W. W. Towne, State Board of Health, Pierre, S. Dak.

SEPTEMBER 22-23.—POUGHKEEPSIE, N. Y.
American Water Works Association—New York Section. (Nelson House.) Sec.-Treas., R. K. Blanchard, 50 W. 50th St., New York.

SEPTEMBER 22-23.—MAMMOTH CAVE, KY.
The Kentucky Municipal League. (Mammoth Cave Hotel.) Exec. Sec., Carl B. Wachs, Administration Bldg., Univ. of Kentucky, Lexington, Ky.

SEPTEMBER 26-29.—BOSTON, MASS.
International City Managers' Association. (Hotel Statler.) Exec. Dir., Clarence E. Ridley, 1313 E. 60th St., Chicago, Ill.

SEPTEMBER 26-28.—MANHATTAN, KANS.
League of Kansas Municipalities. (Hotel Wareham.) Exec. Sec., John G. Stutz, Lawrence, Kans.

SEPTEMBER 26-27.—MINOT, N. DAK.
North Dakota Water and Sewage Works Conference. (Hotel Leeland Parker.) Sec.-Treas., M. D. Hollis, Bureau of Sanitary Engineering, Bismarck, N. Dak.

SEPTEMBER 27-30.—NEW ORLEANS, LA.
International Association of Fire Chiefs. (Hotel Roosevelt.) Sec., James J. Mulcahey, 16 Franklin Ave., Yonkers, N. Y.

SEPTEMBER 29-OCTOBER 1.—MINNEAPOLIS, MINN.
American Water Works Association—Minnesota Section. (Hotel Nicollet.) Sec.-Treas., Ronald M. Finch, Wallace & Tiernan Co., Inc., 416 Flour Exchange, Minneapolis, Minn.

SEPTEMBER 29-30.—COLUMBUS, OHIO.
Ohio Conference on Sewage Treatment. (Fort Hayes Hotel.) Sec., B. M. McDill, Dept. of Health, Columbus, Ohio.

OCTOBER 3-5.—NEW YORK CITY.
American Public Works Association. (Hotel Pennsylvania.) Exec. Dir., Frank W. Herring, 1313 E. 60th St., Chicago, Ill.

OCTOBER 3-7.—PITTSBURGH, PA.
National Recreation Association. (William Penn Hotel.) Administrative Sec., Thomas E. Rivers, 315 Fourth Ave., New York.

OCTOBER 5-7.—CHICAGO, ILL.
American Municipal Association. (Hotel La Salle.) Exec. Sec., Clifford W. Ham, 1313 E. 60th St., Chicago, Ill.

OCTOBER 6-7.—WASHINGTON, D. C.
American Water Works Association—Four States Section. Sec.-Treas., Carl A. Hechmer, Washington Suburban Sanitary District, Hyattsville, Md.

OCTOBER 6-8.—HARTFORD, CONN.
Joint meeting. (Hotel Bond.) *New England Sewage Works Association.* Sec., F. W. Gilcreas, State Dept. of Health, Albany, N. Y. *New York State Sewage Works Association.* Sec.-Treas., A. S. Bedell, State Dept. of Health, Albany, N. Y.

OCTOBER 9-11.—CHICAGO, ILL.
Institute of Traffic Engineers. (Stevens Hotel.) Sec.-Treas., Harold F. Hammond, 60 John St., New York.

OCTOBER 10-12.—MILWAUKEE, WIS.
American Water Works Association—Wisconsin Section. Sec., L. A. Smith, City Hall, Madison, Wis.

OCTOBER 10-14.—CHICAGO, ILL.
National Safety Council. (Stevens Hotel.) M'ng Dir., W. H. Cameron, 20 N. Wacker Drive, Chicago, Ill.

OCTOBER 12-14.—KEARNEY, NEBR.
League of Nebraska Municipalities. (Fort Kearney Hotel.) Sec.-Treas., C. E. Beals, 204 Brownell Bldg., Lincoln, Nebr.

OCTOBER 13-15.—DES MOINES, IOWA.
American Water Works Association—Missouri Valley Section. (Hotel Fort Des Moines.) Sec., E. L. Waterman, Univ. of Iowa, Iowa City, Iowa.

OCTOBER 13-14.—MADISON, WIS.
League of Wisconsin Municipalities. Sec., F. MacMillin, 30 E. Johnson St., Madison, Wis.

OCTOBER 17-20.—OKLAHOMA CITY, OKLA.
American Water Works Association—Southwest Section. (Biltmore Hotel.) Sec.-Treas., Lewis A. Quigley, 3320 W. Berry St., Fort Worth, Texas.

OCTOBER 19-21.—ATLANTIC CITY, N. J.
Pennsylvania Water Works Association. (Haddon Hall.) Sec., Dr. F. Herbert Snow, 327 Telegraph Bldg., Harrisburg, Pa.

OCTOBER 21-22.—ASBURY PARK, N. J.
American Water Works Association—New Jersey Section. (Berkeley-Carteret Hotel.) Sec.-Treas., H. N. Lendall, College of Engineering, Rutgers Univ., New Brunswick, N. J.

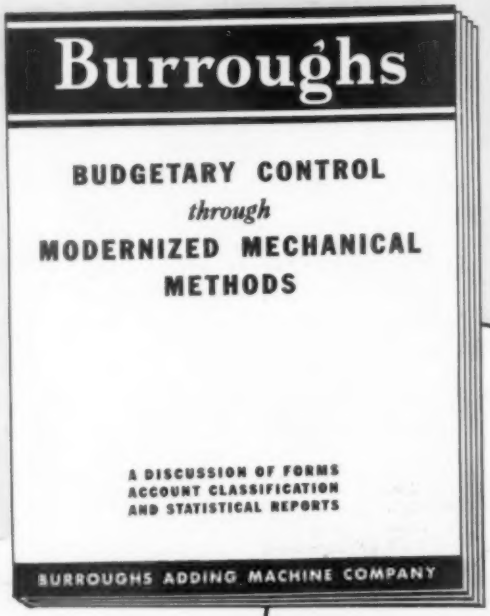
OCTOBER 23-26.—NEW ORLEANS, LA.
National Association of Commercial Organization Secretaries. (Hotel Roosevelt.) Asst. Sec.-Treas., Mrs. Norma McKellops, 1615 H St., Washington, D. C.

OCTOBER 25-28.—KANSAS CITY, MO.
American Public Health Association. Exec. Sec., Dr. Reginald M. Atwater, 50 W. 50th St., New York.

OCTOBER 26-29.—RIVERSIDE, CALIF.
American Water Works Association—California Section. (Mission Inn.) Sec.-Treas., Carl M. Hoskinson, Div. of Water, Sacramento, Calif.

DECEMBER 5-9.—DALLAS, TEXAS.
American Association of State Highway Officials. Exec. Sec., W. C. Markham, 1220 Nat'l Press Bldg., Washington, D. C.

DECEMBER 12-15.—LOS ANGELES, CALIF.
Asphalt Paving Conference. The Asphalt Institute. M'ng Dir., J. E. Pennybacker, 801 Second Ave., New York.



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February 28, 1938

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Sincerely yours,
T. Coleman Andrews

TCA:A

This genuinely helpful book is a practical guide to budgetary control for City, County, State and Federal Government offices. It tells how to apply modern methods in producing necessary records and reports of budget operations and fund balances. Classification of accounts; budgetary practices; recording and controlling revenues and expenditures; maintaining up-to-date budget balance—all are simply described. Included also are the methods for preparing reports and statistics on comparative forms for a quick check against income and expense estimates and reports of previous periods. Ask your local Burroughs representative to review this manual with you. Call the local Burroughs office, or mail the coupon.

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News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

A WALTER AERIAL TRUCK WITH POWER HYDRAULIC DURALUMIN LADDER, RECENTLY DELIVERED TO THE CITY OF NEWBURGH, N. Y.

An Hydraulic Aerial with Duralumin Ladder

A new aerial truck with a power-operated 65- or 75-foot metal ladder mounted on a Walter four-point positive drive truck has been announced by the Walter Motor Truck Co., 1001-19 Irving Avenue, Ridgewood, Queens, Long Island, N. Y. The truck has three automatic locks or torque proportioning differentials. The center differential functions between the front and rear wheels and the two other differentials function between the right and left wheels, taking care of any requirement of difference in speed of rotation of the wheels due to unequal tire diameters or when making turns.

The Walter chassis has been specially designed for this aerial ladder equipment. The wheelbase is exceptionally short, 222 inches, in order to give a better-balanced machine and a shorter turning radius, which is very important on narrow roads or congested streets. This shorter wheelbase is obtained by setting back the front axle and by moving the driver's seat ahead. The frame is of a special drop type, giving a lower center of gravity and an overall height of less than 8 feet. This, with the Walter suspended double reduction drive which has less unsprung weight, and with the low-mount flat spring design, improves the riding qualities.

The heavy-duty six-cylinder motor develops over 150 hp at moderate engine speed. The transmission provides four forward speeds and one reverse, with a quick shift between the fourth gear giving a speed of 45 miles per hour. The third speed is 35 miles per hour. A quick-acting brake system is provided by means of vacuum power booster brakes.

The 65- or 75-foot metal ladder is of the three-section type, made of high-strength Duralumin, with a special truss design and cross and torsional bracing resulting in strong construction without excess weight. The ladder is raised and lowered, and the flyladders extended or lowered by hydraulic power with centralized one-man control. In addition, double-acting hydraulic jacks brace the turntable as required. The hydraulic power system is operated by a Vickers high-pressure pump of 30 gallons per minute capacity. A double valve located on the turntable permits raising the ladder or extending the flies, or lowering them, either simultaneously or independently. The main ladder is raised or lowered by large, long-stroke twin rams. The flyladders are extended by a hydraulic motor operating a worm-driven winch and a stainless steel cable.

Depressing One Key Subtracts from Total

An Electric Duplex Calculator, equipped with direct subtraction, has recently been developed by the Burroughs Adding Machine Co., 6071 Second Boulevard, Detroit, Mich., to do a complete calculating job with but a single handling of the figures. The result of a single calculation, appearing in the lower of two sets of dials, can be verified for accuracy before being transferred to the upper set of dials, which provides the grand total or net result. If the amount is incorrect, it can be cleared from the lower dials without affecting the figures already accumulated in the upper dials.

The Electric Duplex Calculator is equipped with a subtract key by which the amount in the lower dials is quickly subtracted from an amount in the upper dials without the use of complementary figures. Thus, any amount in the lower dials can either be added to or subtracted from the amount in the upper accumulating register merely by touching the plus bar or the minus key.

Where calculations result in fractions of cents, the machine will either give or take the half-cent as desired, or accumulate the fractions in the normal way. These calculators are available either in 10- or 14-column capacities.

THE ELECTRIC DUPLEX CALCULATOR, LATEST BURROUGHS DEVELOPMENT

PHOMAIRE PLAY PIPE IN ACTION

Larger Foam-Making Water Nozzle

A larger capacity Phomaire Play Pipe that makes 500 to 750 gallons of fire-smothering foam per minute and produces 350 gallons of foam from only one gallon of Phomaide solution is offered by the Pyrene Manufacturing Co., Newark, N. J. It almost doubles the capacity of the pipe placed on the market more than a year ago and used by the fire departments of Winston-Salem, N. C.; Bangor, Maine; Memphis, Tenn.; Fall River, Mass.; Ashland, Ohio; Danville, Ill.; Greenville, Texas, and others.

Chris F. Bingham Named New District Manager

The Columbia Alkali Corporation, Barberton, Ohio, has appointed Chris F. Bingham, formerly of its Technical Service Department, to the position of District Manager of its new sales office at 3034 North 16th Street, Philadelphia, Pa.

Mr. Bingham is a graduate in chemical engineering of the Virginia Polytechnic Institute, a member of the American Water Works Association, the Pennsylvania Water Works Operators' Association, and the American Institute of Chemical Engineers. He was plant manager of the Richmond (Va.) Department of Public Utilities for several years.

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The Original Parking Meter

Built specially for parking meter service. Not an assembled product.

3RD ANNIVERSARY DUAL PARKING METERS

JULY, 1935-JULY, 1938, OKLAHOMA CITY

The first City in the World to install Metered Parking

AUTOMATIC METERS - PROVEN SUCCESS

More automatic meters in operation than all other meters combined. Many thousand meters operating millions of times in this period show 99.8% perfect operation . . . in all weather conditions . . . MOST SIMPLE OPERATION . . . More simple for the public to operate . . . Drop the nickel in the slot and operation starts . . . NO HANDLE to turn . . . Revenue greater by about 10% . . . Expense of maintenance much less.

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Approximately 50% DUAL CITIES have made additional DUAL installations.

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Commerce Exchange Building — Oklahoma City, Oklahoma

"RAIN for the Asking"

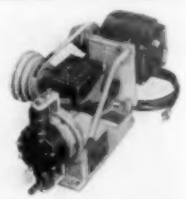
A catalog that explains in detail the various types of watering equipment designed to keep your parks and parkways always fresh and green. Skinner System engineering and consulting service has solved every conceivable type of watering problem. We are equipped to handle your watering problems better at lower cost. A card or letter brings you the catalog and details of our service. No obligation.

The Skinner Irrigation Co., 447 Canal St. Troy, Ohio

NOW is the time to worry about chlorinating your swimming and wading pools—

Alert officials are already making summer plans. Taking a chance on the contagion which may easily result from use of unsterilized swimming and wading pools is just plain "dumb-foolishness"—especially since %Proportioneers% have pointed the way to low priced hypo-chlorination.

Write us NOW—the size of your pool, method of filling, and chemical or chemicals you intend to use.



Heavy Duty Midget Chlor-O-Feeder

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Associated with Builders Iron Foundry

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PROPER HOUSE NUMBERING

There is a right and a wrong way to plan house numbering in a city. Send for special report compiled by authorities on this subject. No charge, of course.

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Send for catalog giving complete details on Iron and Chain Link Wire Fence, Ornamental Iron and Wire Work and other Stewart Products

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THE 12-TON BUFFALO-SPRINGFIELD ROLLER POWERED WITH A CATERPILLAR D4400 DIESEL ENGINE IN USE AT SPOKANE, WASH.

Road Rollers Powered with Diesel Engines

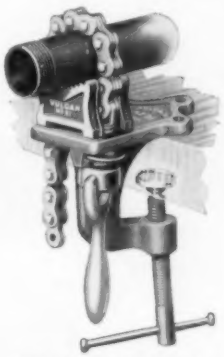
The city of Spokane, Wash., has recently acquired a 12-ton Buffalo-Springfield road roller powered with a Caterpillar D4400 diesel engine and equipped with electric lights for night work. Heretofore, the rollers operated by that municipality have been Buffalo-Springfields powered with gasoline motors, and they are still being retained in the city's service. Both rollers are manufactured by The Buffalo-Springfield Roller Co., Springfield, Ohio.

For many years throughout the world, power for the propulsion of self-moving road rollers has been changing from steam to that of various types of internal-combustion engines. Owing to the high cost of gasoline in most foreign countries, the tendency has been toward the use of the diesel principle but nearly all European makes of diesel road rollers have been of the single-cylinder type that would have no favor in the eyes of American users. The mass production of American multiple-cylinder diesel and Hesselman engines has brought the cost of such high-grade power units to a point where the ultimate fuel economy can more than compensate for the higher initial cost, and diesel-powered rollers of American makes have been sent to many foreign countries. More recently, a demand for oil-burning road rollers has appeared in the United States and Canada.

A New Clamp Vise for Small Pipe

A new pipe vise that can be readily and firmly attached to a bench post or other support without the use of bolts or screws has been announced by J. H. Williams & Co., 75 Spring Street, New York. This Vulcan clamp kit vise No. 21 weighs only 5¾ pounds and will handle pipe from ⅛ to 2 inches in diameter.

The clamp member is integral with the base, and the clamp screw, set at a slight forward angle, as seen in the illustration, carries a swivel with a thin V lip projecting from its upper edge. Consequently, the vise can be securely and



THE NEW WILLIAMS CLAMP KIT VISE NO. 21

rigidly attached to a bench or other support. The drop-forged jaws are saw-tempered for file sharpening. The chains are of the same quality as those used in Williams' Vulcan tongs, and the jaws, chain, nut and handle are interchangeable with similar parts of Vulcan vise No. 1.

Complete information with descriptive literature may be secured from the manufacturer.

Internal Combustion Booklet by Worthington

A new 36-page booklet, illustrating various installations of diesel and gas engines, was recently published by Worthington Pump and Machinery Corporation, of Harrison, N. J. Among the first in America to build internal combustion engines, Worthington pictures in this new publication the extensive application of diesel and gas engines in every field where power is an essential factor. In a period of forty years, Worthington has furnished over a million horsepower in units of all types.

The Worthington diesel engines are of the heavy-duty type, ranging from 50 to 1,500 horsepower at speeds from 225 to 600 rpm, and their modern vertical four-cycle single-acting direct-injection design is the result of experience in building all types of engines. Their gas engines range in size from 30 to 1,800 horsepower, and are designed to operate on natural, manufactured, refinery, sewage-sludge, producer or any mixture of gases. The characteristics of the vertical type follow closely those of the diesels, while the horizontal double-acting gas engines operate at speeds from 125 to 20 rpm. The latter are used on gas compressor service and are suitable for general power requirements where gas fuel is available.

The new bulletin contains nearly one hundred illustrations of Worthington engines in service, demonstrating their range of sizes and services. Those persons writing for it should ask for bulletin S-500-B13.

ONE OF A FLEET OF 207 ENTIRELY NEW REFUSE COLLECTION TRUCKS TO BE USED IN NEW YORK CITY BY THE DEPARTMENT OF SANITATION

These trucks are equipped with fully enclosed, mechanically operated bodies and are especially adapted for use with snow-plows in the winter. The truck shown above is an Autocar with a 20-cubic-yard Heil body, having a conveyor-type loading device and a dumping angle of 55 degrees

AUTOMATIC ASPHALT PATCH PLANT

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A COMPACT, EFFICIENT, ONE-UNIT ASPHALT REPAIR PLANT

FOR ACCURATE BATCH MIXING

STATIONARY OR PORTABLE TYPES

MANUFACTURED BY

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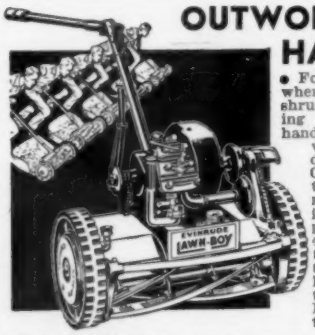
Weeds are Now Mature

THAT'S why you want a chemical with extra power—power enough to penetrate the roots of mature, full-grown weeds. And Dolge Weed-Killer gives you this power—extra power—the kind of power that works down deep, killing the roots and finishing the growth. Dilute in water, 1-to-40, for ordinary growth; then simply sprinkle. Dolge Weed-Killer also finishes poison ivy, Canada thistle, crab grass and other rank, hardy, deep-rooted growth. Details and quotations on request. Dolge 1938 Ground Maintenance Manual sent free on request. Send a postal card today.

DOLGE WEED-KILLER

The C. B. Dolge Co. Westport, Conn.



OUTWORKS 3 TO 5 HAND MOWERS

● For park and boulevard lawns—where trees, walks, flower beds and shrubs make ordinary power-mowing slow and difficult—the "one-hand" EVINRUDE Lawn-Boy outworks 3 to 5 hand mowers and does a better job! Cuts 18" swaths, works 6" closer to trees, etc., than most hand mowers, trims steep terraces easily and its light weight won't pack or tear soil. Rubber tires, 4 cutting heights, automatic control of starting or stopping through one-hand movement of handle grip. Model "D" illustrated, $110. Model "S," $89.50, F.O.B. Factory. Write for literature.

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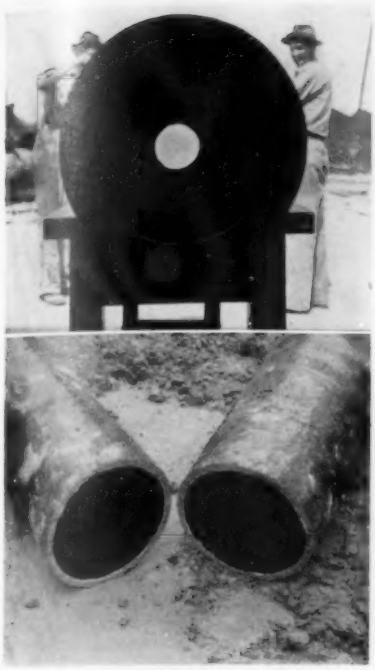


ACIPCO'S NEW ENAMELINE PIPE

Above—Looking through pipe being Enamelined immediately after the cement lining and the final interior coating of asphalt were applied. Below—a Mono-Cast Enameline pipe cut with an ordinary hammer and cleaver

New Cement Lining for Cast Iron Pipe

A new lining for cast iron pipe and fittings which is said to prevent tuberculation, reduce friction of flow, maintain permanently high "C" values, and minimize pumping costs, has been announced by the American Cast Iron Pipe Co. of Birmingham, Ala. The lining consists of two coats of cement and a finishing seal coat of asphalt paint; it is centrifugally applied to regular Mono-Cast centrifugal pipe, and applied by hand to the fittings. When so lined, the pipe and fittings are marketed under the trade name "Enameline."

The manufacturers offer Enameline as an alternate for standard tar coating—at no extra cost—and recommend it for water-main service throughout the United States except in very special cases where additional thickness of lining would seem to be desirable.

In the Enameline process, the pipe are lined by an improved centrifugal lining process combined with troweling action which assures a thorough and uniform distribution of cement mortar evenly throughout the inside surfaces of the entire length of the pipe. The cement mortar is introduced inside the pipe by means of a hollow tube which houses a conveyor screw. One end of this tube is fitted with a distributor head through which the mortar is forced out by the conveyor screw. The distributor head is equipped with flexible troweling shoes, which spread the mortar thoroughly, evenly and uniformly on the wall of the pipe. The Mono-Cast centrifugal pipe is revolved as the first coat of cement mortar is uniformly troweled onto the wall and effectively bonded to the bare metal pipe surface. Immediately following this initial application, the pipe is accelerated to high speed, and the mortar distributing head is drawn back through the pipe, applying the second coat on top of the first, thus eliminating all voids and producing a cement mortar lining 1/16-inch thick, thoroughly compacted and of uniform thickness. The high speed of revolution of the pipe is maintained for a few seconds after the distributing head is out of the pipe, in order to impart a "float" finish to the inside surface of the lining, giving it exceptional smoothness.

Approximately one hour later, while the cement mortar is still wet, a finishing seal coat of asphalt paint is applied with a 360-degree spray. This seal coat facilitates curing and protects the cement lining against the leaching-out of lime when exposed to extremely soft waters.

The value of "C" for new Mono-Cast Enameline pipe is 140 or more, and since Enameline prevents internal corrosion and tuberculation, this initial high-flow capacity is maintained throughout the life of the pipe. Mono-Cast Enameline pipe have internal diameters equal to or greater than nominal diameter, and with their maintained high "C" values insure maximum capacity with the minimum sustained pumping costs.

In making recent extensions to its water-distribution system with Mono-Cast Enameline cast iron pipe and fittings, Columbus, Ga., enjoyed the distinction of being the first user of "Acipco's" latest contribution to an improved cast iron pipe. As indicated by the accompanying photograph, Mono-Cast Enameline pipe cuts sharply and clearly, without cracking or chipping the lining. Workmen of the Columbus Water Works made these cuts with an ordinary hammer and cleaver, rolling the pipe as the cut was made.

Improved Graders for City Work

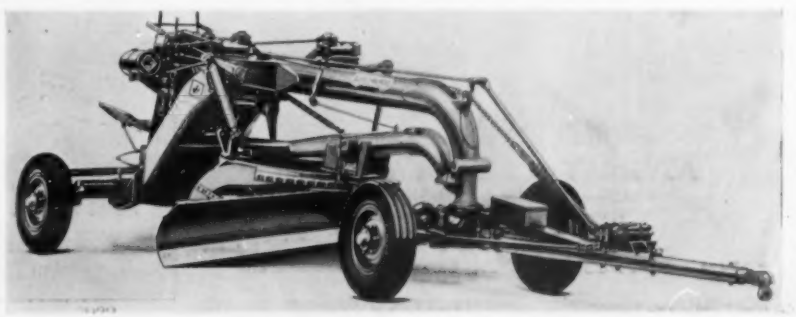
Two new models of pulled graders designed and developed to meet the demand for a type of equipment that would have strength, balance and a wide range of usefulness to accomplish economically the close tolerances and improved finishes required in municipal work, have been announced by the Tractor Division, Allis-Chalmers Manufacturing Co., Milwaukee, Wis. These models, 110 and 112, were first shown at the Cleveland Road Show last January and brought forth considerable interest. They are equipped with a tubular section frame, said to be the strongest section per pound of weight available, and are built with all-welded construction. Cast steel is used to form parts which require unusual shape to obtain maximum strength where complicated stress applications prevail. Structural angles, channels and plates are utilized where bending stresses predominate.

The outstanding construction feature of the machine is the patented Allis-Chalmers leaning frame. This enables the operator to concentrate the weight of the machine on the blade when desired. Operator comfort and ease of operation of the controls are accomplished by use of the frame lean, which provides a level spring-mounted platform, even when the rear axle is inclined on a 25-degree slope.

The lift cases are mounted forward above the circle to eliminate the torsional deflection of the customary long shafts. To permit standardization, only two sizes of worm gears are used in each model, and all gear cases are mounted to reduce strains and to provide easy accessibility. Automatic brakes prevent the control shafts from creeping when the control clutches are disengaged. A wide range of blade positions is obtained on the 360-degree rotation of the crank arms. The low line of draft through the ball-and-socket drawbar connection results in more effective blade capacity.

G. E. Seaberg with Pittsburgh Meter

Announcement has been made of the appointment of George E. Seaberg as Sales Manager of the Coupling and Fitting Division of the Pittsburgh Equitable Meter Co., 400 Lexington Avenue, Homewood, Pittsburgh, Pa. Mr. Seaberg's long experience makes him well qualified to head this newly created department. For the past twelve years he has been associated with the Dresser Manufacturing Co. as Manager of its Water Works Division, and prior to that, he was with the Peoples Gas, Light and Coke Co., of Chicago, in an engineering capacity.



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MUD-JACK METHOD

Sunken concrete slab is raised to correct grade by the Mud-Jack Method — preventing breakage of the slab and eliminating reconstruction costs.

Increase the life of concrete slab by the Mud-Jack Method. Write for information about economical maintenance of curb, gutter, and sidewalk slab.

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He is telling Park and Playground Superintendents, Water Works Superintendents, Mayors, Boards of Education and Health Officers:—

"The MURDOCK is the ultra-modern, rust-proof, trouble-free drinking fountain, approved by more than 900 cities."

Write for full particulars of our improved fountains. If you have *old* Murdock fountains, let us modernize them.

The Murdock Mfg. & Supply Co.
Cincinnati *Since 1853* Ohio

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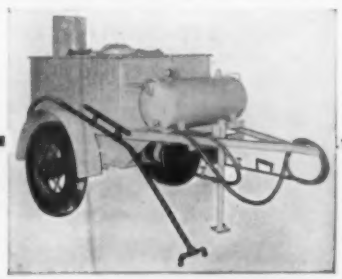

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Fire Proof—Oil Burning
Hand and Motor driven spray.
Many sizes. Write for catalog.

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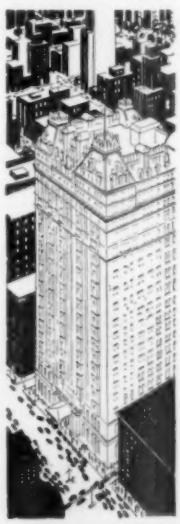

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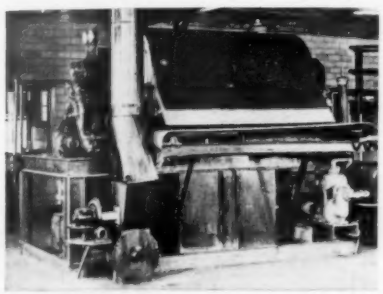
The Field for Sludge Dewaterers

In the early days of sewage treatment, cities or large towns in many cases ran sewage sludge out onto vacant areas to dry, but such methods of disposal had serious drawbacks. Most sludges if subjected to slow dewatering become septic or odorous, and attract flies. At best, drying beds are unsightly or they involve special coverings.

For many years the engineers of Oliver United Filters Inc., 33 West 42nd Street, New York, have carried on extensive research and tests on the problems of sludge dewatering for practically every type of sewage treatment, so that now automatic vacuum filtration is available through Oliver continuous sludge dewaterers for all kinds of sludge. It is even practical to combine certain industrial wastes and city sewage and treat



OLIVER SMALL ALL-ASSEMBLED SLUDGE DEWATERER AT ST. CHARLES, ILL.

them properly, as is being done at Rockford, Mich., on a 100-square-foot Oliver Dewaterer handling raw sewage and tannery waste.

Small cities and large towns such as those with only one or two million gallons per day flow may install a small Oliver "All-Assembled" sludge dewaterer. This unit is in effect a miniature dewatering plant with proper sludge conditioning facilities assembled with the filter and its necessary auxiliaries. It is shipped on a platform ready to be set up in the plant, power brought in, pipe connections made, and arrangements instituted for sludge-cake disposal.

Bulletin 240, recently issued by Oliver United Filters Inc., illustrates not only this small dewaterer, but other large types.

Reconditioning of Pipe Lining Improved

At one time a section of 42-inch steel pipe was reconditioned "in situ" for the city of Newark, N. J., and the work, intermittently done, required four years for completion. Recently the T. A. Gillespie Co., 7 Dey Street, New York, reconditioned a parallel length of 21,000 feet of 48-inch pipe with a centrifugally applied cement lining in 25 working days.

Not only has the speed of the work improved, but the cement lining used is said to be thicker and non-leaching.

Python Fed Through Special Rubber Hose

The monthly feeding of the giant python is a red-letter day at the St. Louis zoo and never fails to draw a crowd. The 22½-foot-long reptile, which is known to the press as the "Maharanee of Wangkoo," has been a resident of the zoo for almost nine years. The first six months it was in captivity the snake refused to eat and had to be force-fed. From then on, until last summer, it fed normally. At that time its throat muscles became paralyzed owing to an old injury received prior to its capture, and it was necessary for zoo officials to resume the force-feeding method.

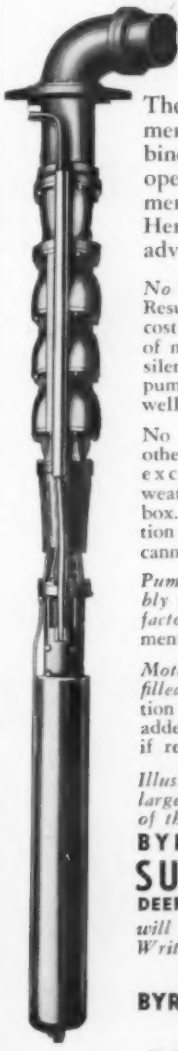
The feeding equipment consists of a 5-foot length of special rubber hose fitted with a removal plunger. The hose used for this delicate operation was supplied by The B. F. Goodrich Co., Akron, Ohio. It has a 2-inch inside diameter and is of just the right stiffness for easy insertion down the snake's throat. To prevent possible injury or irritation of the throat membranes, the hose is made with a smooth white rubber cover.

With the aid of about ten keepers, the huge snake is stretched out on the floor and the hose inserted down past the throat. Then ground rabbit meat is fed into the hose and by means of the plunger is forced into the snake's stomach. This operation is repeated until 21 pounds of meat has been consumed. Quite a bountiful meal, but not a bit too much considering the effort required and the fact that the dinner bell won't ring again for the "Maharanee" for another 30 days.

FEEDING THE MAHARANEE OF WANGKOO AT THE ST. LOUIS ZOO

DUNKING HAS ITS ADVANTAGES

Even IN PUMPS



The Byron Jackson Submersible Deepwell Turbine Pump and motor operate completely submerged in the well water. Here are a few of its advantages . . . .

No long drive shaft! Result: Lower power cost due to elimination of many shaft bearings; silence; no difficulty in pumping from crooked wells. ✓

No *pump house* or other surface equipment except a compact, weather-proof switch-box. Reduced installation expense. Vandals cannot damage. ✓

Pump and Motor assembly tested and sealed at factory. No field adjustment is required. ✓

Motor enclosed in oil-filled case for protection and cooling. Oil added from the surface if required. ✓

Illustrated literature with large cross section drawing of the

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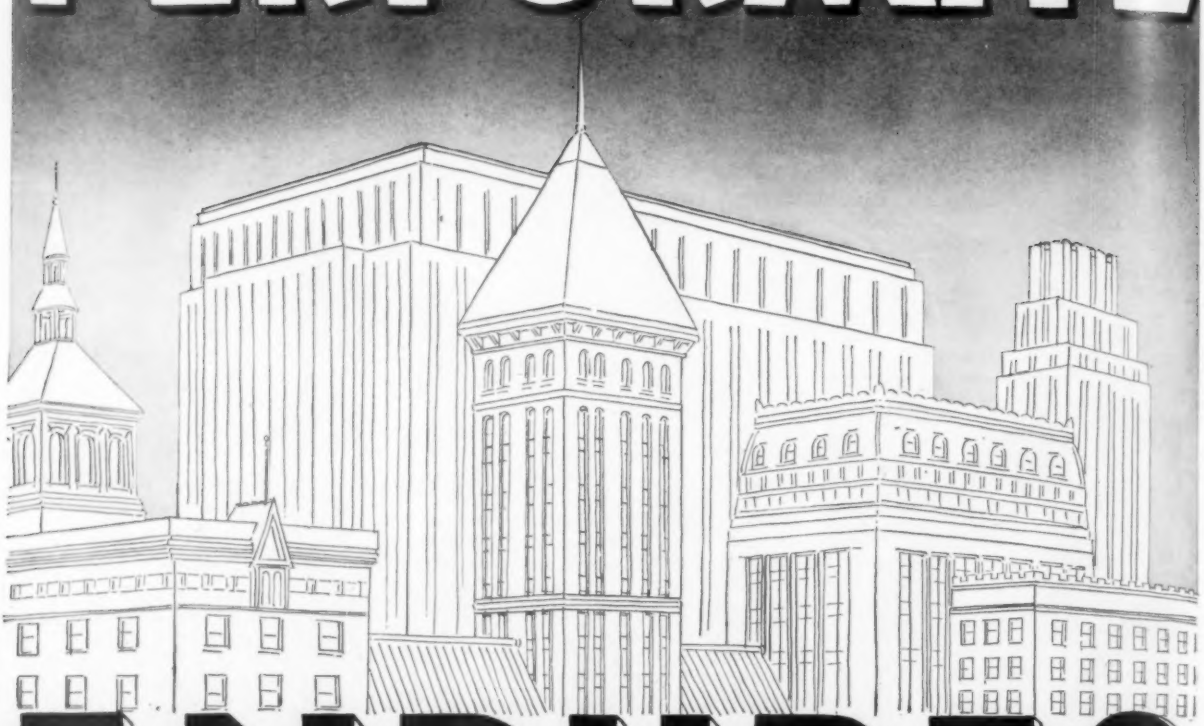

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By all known accelerated aging tests, Performite rubber insulation is far ahead of any other commercial insulation. It is non-corrosive, free-stripping, long-lasting. Performite shows surprisingly little deterioration in the oxygen bomb, air bomb and air oven accelerated age tests.

UNIFORMITY SAFETY PERFORMITE WIRES & CABLES LONG LIFE DEPENDABILITY

One of its outstanding characteristics is its resistance to deterioration by heat. It is recommended for operation at conductor temperatures up to 75 degrees Centigrade, thus providing a tangible advantage over most other types of rubber insulation in economy of copper size. Its stubborn resistance to heat makes it better suited than ordinary rubber insulations for hot locations.

Thus, Performite is the perfect wire for buildings built to last—assuring long life with resistance to heat.

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Outdoor Lighting

A Section of THE AMERICAN CITY
Devoted to the Lighting of Streets, Highways, Bridges, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings.

Come to Brighter Kingston

By CONRAD J. HEISELMAN
Mayor, Kingston, N. Y.

ON September 23, 1937, the new underground ornamental street-lighting system in the uptown business area of the city of Kingston was dedicated with an elaborate celebration. The Mayor, the Board of Public Works and other city officials, the business organizations, civic groups and American Legion Band participated in this celebration. The business organizations conducted a Fall Opening Display in conjunction with the dedication of the new street lighting, with an award of prizes for the best window displays.

The dedication was the culmination of cooperative effort on the part of the city officials and business organizations for the modernization of the uptown business area. In 1930 the Central Hudson Gas & Electric Corporation had installed an underground duct system providing for the removal of all the poles and wires in this area, which remained unused until the present year, when the city administration authorized the installation of ornamental street lighting, consisting of 51 1,500-cp lamps. The city purchased and installed the standards and units, and the electric company installed the wiring.

The festivities of dedication opened at 7:30 P.M. with a parade of the band through the darkened streets. This was followed by the dedication speech in which the Mayor said:

"Street lighting is one of the necessities for improving merchandising methods.

Photo by Pennington

WALL STREET, KINGSTON, N. Y., LOOKING FROM NORTH FRONT TOWARD JOHN STREET

The festivities described by Mayor Heiselman marked the opening of a street-lighting installation which was so successful that the downtown business section has since been modernized with 48 G.E. Form 32 luminaires carrying 10,000-lumen lamps on Union Metal Manufacturing Co. poles. This step was completed last November, and now Broadway, the main thoroughfare connecting the uptown and downtown business sections, is relighted with 84 15,000-lumen and 86 10,000-lumen lamps on metal standards. The conductors are placed underground and the distribution poles removed

"Save Lives with Light"

Modern Lighting Provides Curb-to-Curb Visibility on Buffalo's Delaware Avenue

● Delaware Avenue in Buffalo, N. Y., is a safer thoroughfare today because of modern street lighting. With the elimination of confusing shadows and glare, both motorist and pedestrian now enjoy the protection of light which gives complete curb-to-curb visibility.

Here again, Union Metal heavy-duty steel standards make an important contribution to the success of modern street lighting. It is through their use that the lighting units are suspended at the proper height and distance over the street to give the desired visibility. Ruggedly constructed for resistance against traffic shocks, these standards provide dependable, long-lived mountings that require little maintenance. In addition, the attractive design of Union Metal standards gives them an ornamental value to the community.

Hundreds of cities are today driving death from their streets with the aid of modern street lighting. Let Union Metal engineers show you how light can save lives.

THE UNION METAL MANUFACTURING CO.
CANTON, OHIO

Union Metal Standard Design No. 40026-Y, installed by Buffalo, N. Y.

AFTER

Look at these finely lighted streets in this area. By this we prove to our own people as well as visitors from other communities that Kingston has unexcelled advantages as a modern merchandising center.

"We now have the convenience of being able to see conditions underfoot, and adequate lighting affords protection from the acts of criminal characters.

"Our night-accident hazard is now reduced, because scientific studies show that 60 per cent of the accidents occur after dark when there is only 25 per cent of the traffic, and that adequate street lighting will decrease accidents up to 5 per cent.

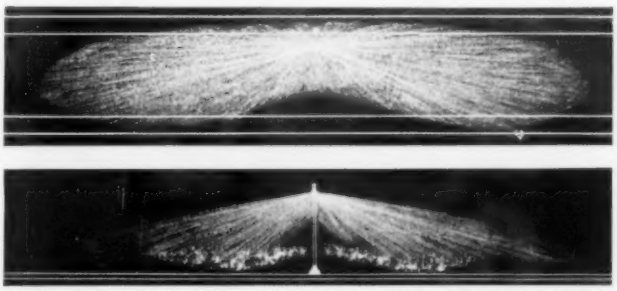
"This installation is another important step taken in the plan to make Kingston a more beautiful, a more prosperous and a safer place in which to live.

"I express my appreciation for the opportunity of participating in this celebration, and may I urge upon the members of the various business groups the necessity for cooperative action in developing programs that will create enthusiasm for and appreciation of the shopping facilities in this city. In behalf of our business men and citizens I take great pleasure in dedicating to the future convenience and safety of our citizens and visitors this modern ornamental street-lighting system."

I then turned on the lights, which showed the streets filled with some 10,000 citizens who were loud in their praise for the new lighting system. The merchants unveiled their windows, the judges awarded the prizes, and the happy evening closed with a block dance.

You Can Have Well-Lighted Streets

By A. J. SWEET
Consulting Engineer, New York City



TOP—LOOKING DOWN ON THE STREET. BELOW—LOOKING ACROSS STREET AT LAMP. THIS IS THE EFFECT OBTAINED BY USING THE CORRECT EQUIPMENT

CITIES as a rule are underlighted, encouraging accidents and crime and reducing the pleasure of being out at night. To light them adequately by the hit-or-miss methods often employed would probably increase present costs from 3 to 5 times. *At the present cost*, however, by using the correct lamp size, lamp locations and mounting heights and equipment, which would put 50 per cent instead of 25 per cent of the light on the street, many cities could more than double the effectiveness of their street-lighting service.

In cities which purchase current for street lighting from private utilities, municipal officials too often assume rate reduction to be the only available economy. Present rates, however, while generally somewhat excessive for the larger lamps, may actually be inadequate for the smaller lamps.

Nor will this better illumination emanate from a new wonder lamp. It is a waste of time to continue to exist in semi-darkness, waiting for a new light source. Authorities say none will be produced in the next twenty years that will reduce cost more than 10 to 15 per cent. Proper procedure for today and all the tomorrows of this generation is to act on competent technical advice in correcting the existing lamps and equipment.

The first logical step in any street-lighting program is to obtain maximum service at present expenditure. Some time in the future our municipalities will find it to their interest to increase expenditures to about double the present cost per mile of light. For 30 cents per foot for residence streets ($1,584 per mile) and for 40 to 45 cents for all streets ($2,100 to $2,400), our streets can be made as safe by night as by day.

Chicago's Sodium-Lighted Intersections

By LESLIE J. SORENSON
Chicago Traffic Engineer; President of the American Institute of Traffic Engineers

OF the 836 persons killed in Chicago last year, fully 75 per cent were afoot, and 66 per cent of the accidents were in dusk and darkness, when traffic averages one-third of the 24-hour volume. Thus the percentage of serious accidents per unit of traffic volume is averaging for night travel three to four times the accident rate under daylight conditions.

To test the value of modern lighting, sodium-vapor lighting equipment was installed in November, 1937, at the intersection of Cicero and Diversey Avenues; Chicago and Ashland Avenues; and 79th Street, Stony Island and South Chicago Avenues. This experimental project was sponsored jointly by the Utilities Research Commission, Inc., and the Chicago Department of Streets and Electricity. The traffic characteristics at these intersections, both pedestrian and vehicular, are typical of other intersections.

The new lighting units supplement the incandescent lamps, and the average illumination on the pavement at the intersection has been increased about six times by only twice as much electric power, owing to the efficiency of the sodium lamp and its reflector which directs the light down on the pavement.

Five months' results indicate a 17 per cent reduction in total number of accidents. Personal-injury accidents decreased 46 per cent, and accidents involving pedestrians were reduced by 14 per cent, a marked improvement. These facts are already apparent:

1. Pedestrians are in less danger because they are either strongly illuminated or silhouetted at the crosswalks.

2. The officer directing traffic is more easily seen, and one of them says: "Under the old lighting I could shout, blow my whistle and wave my arms, and yet motorists would seemingly try to run me down."

3. Vehicles halted in the middle of the intersection by left turns or halted at the stop line by traffic signals are much more readily visible under the sodium-vapor light, and there is less likelihood of collisions.

4. Obliteration of detail and otherwise blinding action of opposing headlights is reduced, as is readily noticeable.

5. Color is a factor. If the use of sodium lights becomes common for dangerous crossings, then motorists will identify them by their color, and will be forewarned of hazard.

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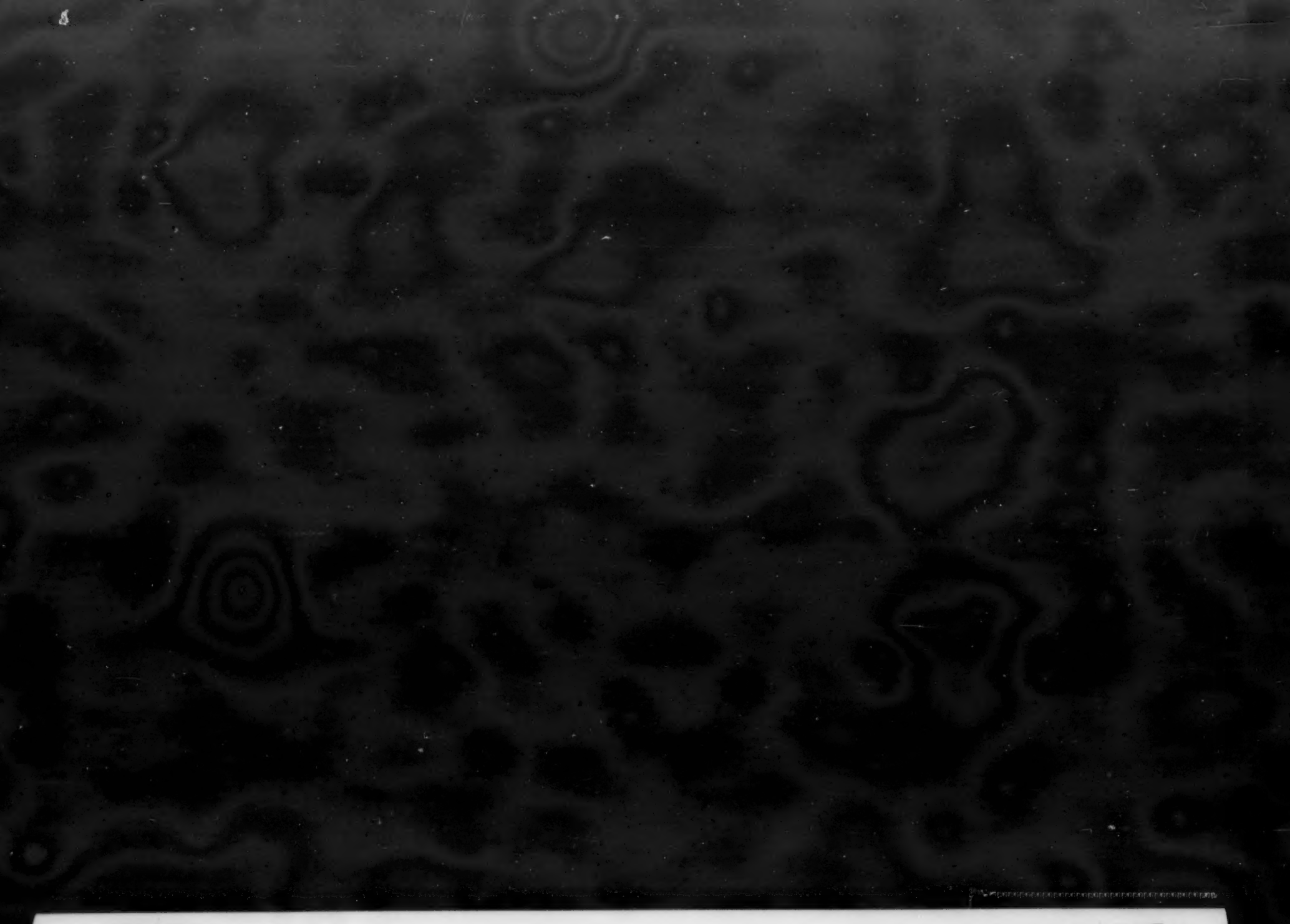

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age 52 of this issue

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